DScan User Manual
Version 1.1

Copyright (c) 2004 - 2012

Moving **Innovation**

Table of Contents

Part I Overview 4

Part II New Installation 6

1 System Requirements ... 8
2 Hardware Unpackaging ... 9
3 Hardware Connections ... 18
4 Turn on/off sequence ... 27
5 Configure System ... 30
6 Reset Axes ... 39
7 Basic Mode Scan ... 40

Part III DScan User's Guide 43

1 Basic Mode ... 44
- UI Elements ... 45
  - Workflow Control Buttons ... 45
  - Toolbar Commands ... 46
    - Import Files ... 46
    - Export Files ... 46
    - Undo/Redo ... 46
    - Mesh Selectors ... 47
    - Fill holes ... 47
    - Spike Removal ... 47
    - Delete Selected triangles ... 48
    - Standard Views ... 48
    - Show/Hide Mesh Borders ... 48

2 Job Driven Mode ... 49
- Acquisition Workflow ... 50
  - Workarea Definition ... 52
  - Total Model Acquisition ... 54
  - Neighbors ... 56
  - Inplace ... 58
  - Multidie ... 60
  - Registration ... 62
  - Finish ... 64
  - Gum ... 65
  - Waxup ... 67
  - Antagonist ... 71
- UI Elements ... 76
  - Arc Jaw ... 77
  - Workflow Control Buttons ... 78
  - Model Tree ... 80
  - Step Bar ... 80
  - Toolbar Commands ... 80
    - Import Files ... 81

© 2012 Enter your company name

Export Files 81
Undo/Redo 81
Mesh Selectors 81
Fill holes 82
Spike Removal 82
Delete Selected triangles 82
Standard Views 82
Show/Hide Mesh Borders 82
Show colormap 83
Gum registration slider 83
3 Preferences 84

© 2012 Enter your company name

1 Overview

DScan is an high-accuracy and high-performance structured light scanner that is extremely user-friendly and can export data into the most common formats used by CAD/CAM applications

Dscan has been developed specifically for the dental industry as an open and completely customizable system, and it is offered to OEM companies that want to brand the instrument and integrate it into their product lines. EGSolutions offers a complete customization of the scanner (both the software and hardware) by fulfilling OEM-specific technical and design requests

The high accuracy and the robust technical features of **Dscan,** the unique design of the optics for example**,** enables technicians to acquire complete arc jaw, stumps and impressions. The scan process is completely automated and uses two synchronized axes controlled by an industrial programmable logic controller (PLC). Users can customize the acquisition strategies and parameters

Dscan key features include:

- High Accuracy and reproducibility: accuracy as high as 15 microns, tested in a metrology environment
- Customizable acquisition strategies: arc jaw, stumps, bridges, antagonists, gum and wax up
- Impression acquisition
- Maximum reliability: high quality mechanical and electronic components
- Open system: dataset are exported in common formats, including STL, PLY and ASC which can be read by any CAD|CAM system
- Compact size: **Dscan**'s reduced size and weight means it can fit in any laboratoty
- Lifetime license: maintenance and update fees available upon request

© 2012 Enter your company name

DScan Technical Specifications:

3D Scanning principle	*Structured light*	
Camera resolution	*1.3 megapixel*	
Light source	*LED, 150 ANSI-lumen*	*30.000 hours*
Rotary stage	*2 axis movement*	*Rotation, Tilting*
3D scanning area (W x H x D)	*90 x 80 x 55 mm*	
Accuracy	*0.015 mm*	
Point distance	*0.04 mm*	
Intput data format	*STL, ASC, PLY, OBJ*	
Output data format	*STL*	
Interface	*USB 2.0, Ethernet*	
Size (W x H x D)	*250 x 450 x 450 mm*	
Weight	*13.5 kg*	

© 2012 Enter your company name

2 New Installation

To connect a Scanner and a PC for the first time and to install all the required software the steps are:

1. Unpackaging and Connect the Hardware
2. Install and Configure the software (Not required if a PC is shipped together with the scanner)
3. Test the Installation

© 2012 Enter your company name

Unpackage and Connect the Hardware

1. Verify if the PC hardware is complaint with the recommended requirements. (Not required if a PC is shipped together with the scanner)
2. Unpackaging the Scanner
3. Connect the Scanner to the PC
4. Turn on/off sequence

Install and Configure the Software

Warning: If a PC is shipped together with the scanner this step is not required

Before installing and configure the software Scanner and PC have to be properly connected and turned on in the right sequence.

1. Configure System

* An Internet connection has be active in order to correctly register the software with a keycode license

Test the installation

Before running for the first time the Scanner application and test it the two previous steps has to be performed:

1. Perform a Reset Axis
2. Acquire a model in Basic Mode

© 2012 Enter your company name

2.1 System Requirements

The following configuration is RECOMMENDED for best results:

- **Processor:** Intel Core i7 or higher
- **Memory:** 8 GB or higher
- **Video card:** Nvidia 5xx series or higher / ATI 5xxx series or higher, with 1Gb or more video ram
- **Operating system:** Windows 7 64bit*
- **Network interface card:** 2 x RJ45 Ethernet adapters or 1 x RJ45 Ethernet adapter + 1 x Wireless adapter

* 64bit OS is a mandatory requirement for **DentalSuite**

© 2012 Enter your company name

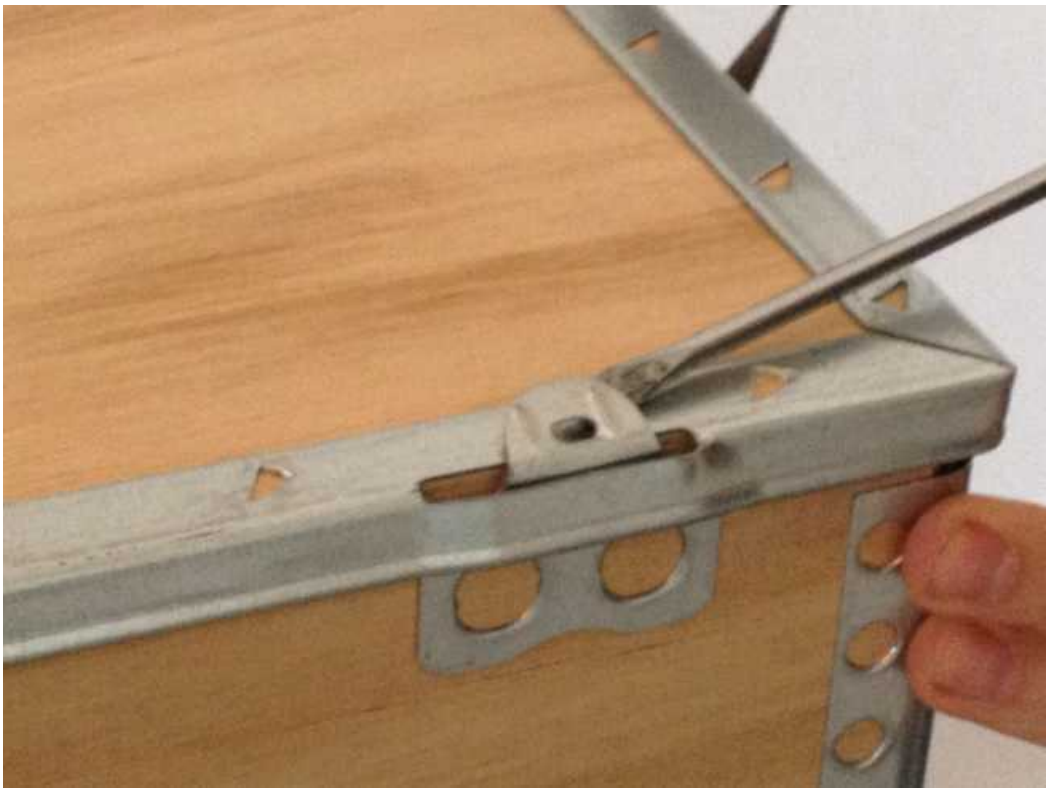
2.2 Hardware Unpackaging

Unpackaging

The DScan is shipped inside a wooden box. You need a slotted screwdriver to open it

Bend the eight stops using the slotted screwdriver to release the top cover plate

© 2012 Enter your company name



© 2012 Enter your company name

Remove the top cover

© 2012 Enter your company name

© 2012 Enter your company name

Remove the cardboard box containing the accessories

Raise the scanner and the foam protections using both hands

© 2012 Enter your company name

Put it on the floor

© 2012 Enter your company name

Remove the two lateral foam protections

© 2012 Enter your company name

Remove the protection bag and move the Scanner on a table close to the PC

Open the frontal cover and check the position of the rotating table. If the position is not horizontal gently move it manually until it is more or less aligned with the inner cover. Reset Axis operation will be performed later in order to achieve the perfect rotary plate position

Warning: Do not perform this operation if the scanner is turned on!

Content of the box

The scanner is packed with all the accessories required to connect and operate. They are stored inside the cardboard box

A) DVD containing:

1. Calibration folder
2. Software folder
3. Documetation folder

© 2012 Enter your company name

B) Blu Tack adhesive

C) Scanner Power cord

D) Flat Circular plate

E) Multidie plate

F) Calibration Glass

G) RJ45 cable

H) USB cable

I) Projector remote control

L) VGA video cable

© 2012 Enter your company name

2.3 Hardware Connections

Hardware Overview

The **DScan** is provided by two Power Switch and some Sockets

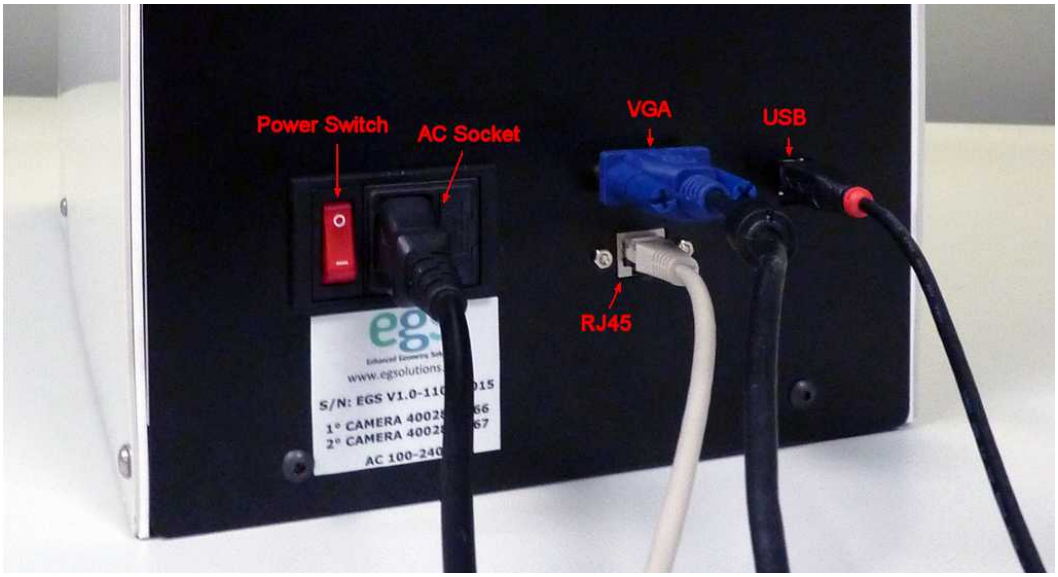
The Projector Switch button is on the frontal panel

In the back panel there are:

1. Power Switch: general power button
2. AC Socket
3. VGA connector: PC -> scanner projector
4. USB connector: PC -> scanner cameras connection

© 2012 Enter your company name

5. RJ45 connector: PC -> scanner electrical motors connection



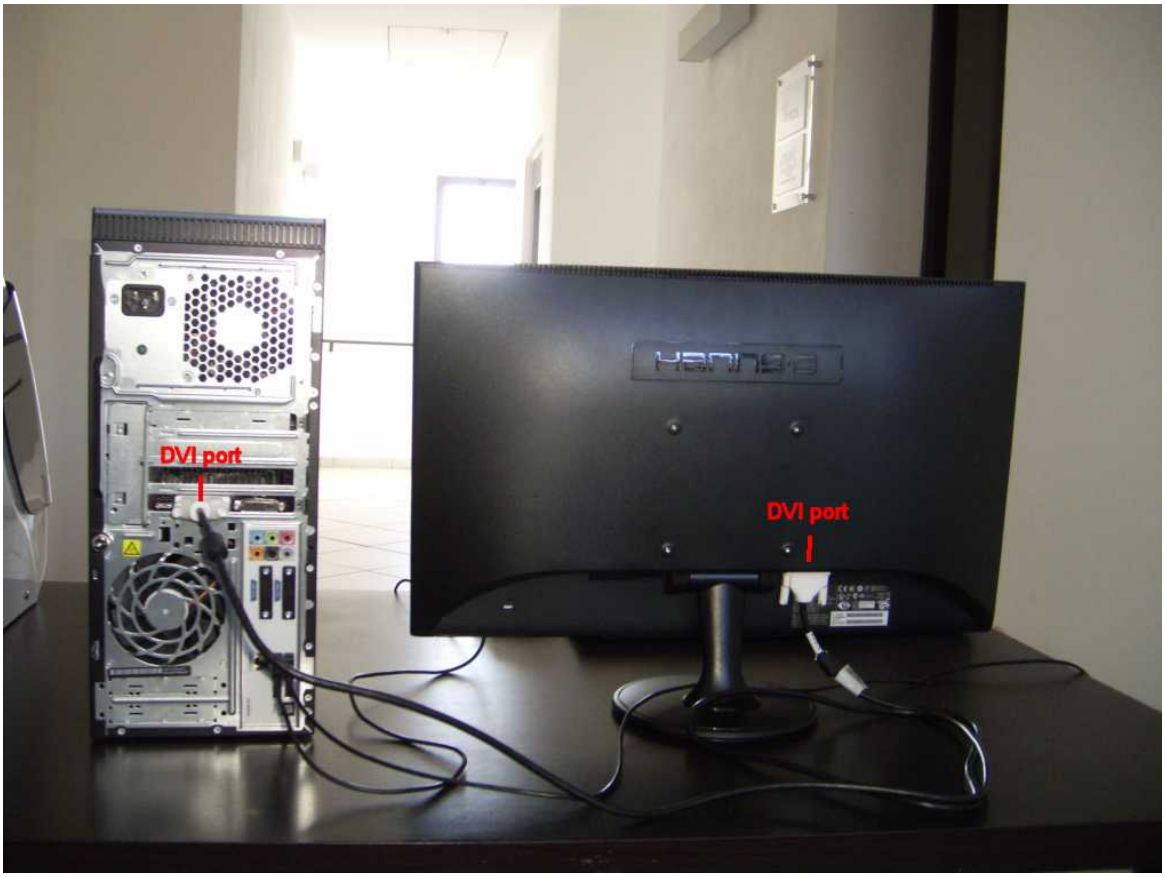
© 2012 Enter your company name

PC Scanner connections

1. Connect the mouse and the keyboard using two USB port in the PC back panel. The PC can be provided by a wireless connection for the mouse and keyboard, in this case only one USB port is used

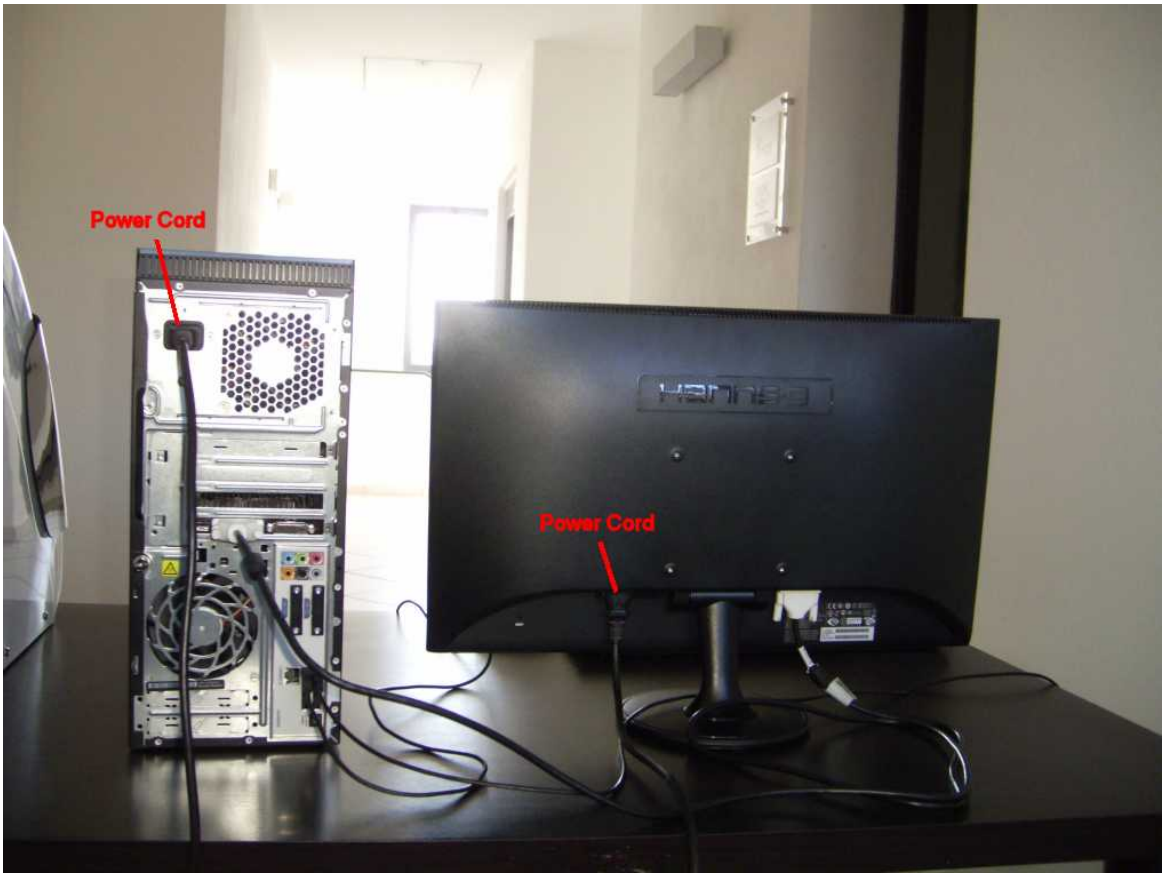
2. Connect the the first PC DVI port to the monitor DVI. Depending from the graphical device and monitor also VGA cable can be used. Sometime can be used adapters DVI-VGA in order to connect the PC and the scanner projector

© 2012 Enter your company name



3. Connect the PC and Monitor to AC . The PC has to be switch off before connecting the Scanner

© 2012 Enter your company name



4. Connect a free PC USB 2.0 port to the scanner USB

© 2012 Enter your company name

5. Plug the PC RJ45 port to the Scanner RJ45. The PC and the scanner have to be directly connected.

© 2012 Enter your company name

6. Place the VGA cables on the back of the Scanner and in the second DVI PC port (an adapter DVI -VGA not included is required depending from the PC graphical device installed)

© 2012 Enter your company name

7. Plug the Power Cord on the back of the Scanner device

© 2012 Enter your company name

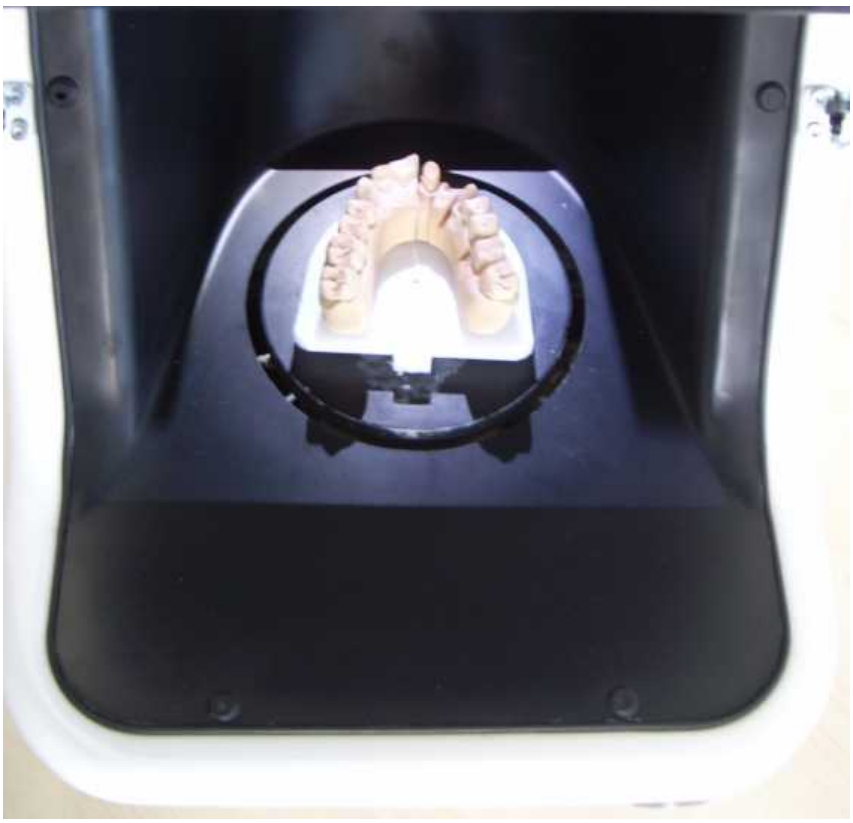
© 2012 Enter your company name

2.4 Turn on/off sequence

Turn on sequence

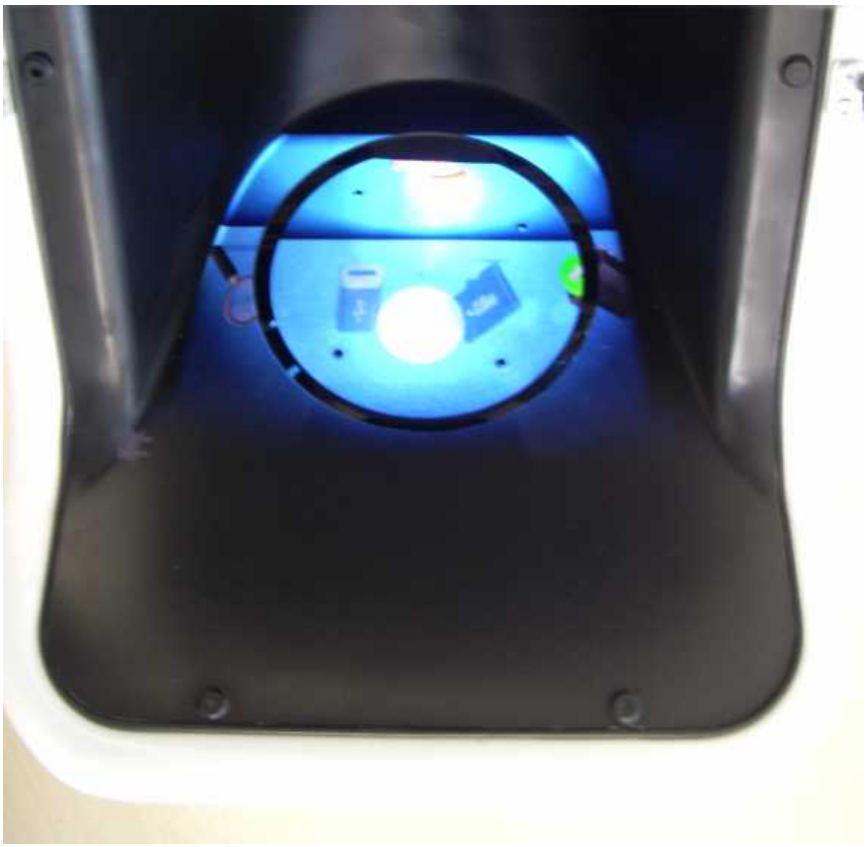
1. Turn on the PC
2. Turn on the Scanner using the Power Switch on the back of the device
3. Turn on the Projector using the frontal switch button

The projector should illuminate the rotary table of the Scanner with a white light like the image below:



If some icons are visible means the scanner do not set the right input source:

© 2012 Enter your company name



To solve the issue use the Source Button in the remote control.

© 2012 Enter your company name

Turn off sequence

1. Turn off the Projector using the frontal button
2. Turn off the scanner using the Power Switch
3. Turn off the PC

© 2012 Enter your company name

2.5 Configure System

Configure System Check List

1. Turn on the PC, Turn on the Scanner and then turn on Scanner Projector using frontal button
2. Using remote control to force the projector to find the PC input
3. UAC disable, the current user has to be Admin type
4. Double monitor → Second Monitor one has to have 1280x720. (No Screen Saver)
5. IP address for the ethernet scanner device 192.168.179.54
6. Power Option → High Performance
   - Turn off display → Never
   - Put the computer to sleep → Never
   - Advance power option USB setting → disable
7. Install flexscan 3.0 using default parameters and folders
8. Create two Folders in the PC:
   - C:\Program Files\3D3Solutions\FlexScan3D 3\Projects
   - C:\Program Files\3D3Solutions\FlexScan3D 3\Calibrations
9. From Scanner CD copy the Calibration02 folder inside Flexscan Calibrations folder created in the previous step
10. Run Flexscan3.0 (PWD is required) and change Settings:
    - Default Project Path: C:\Program Files\3D3Solutions\FlexScan3D 3\Projects
    - Default Calibration Path: C:\Program Files\3D3Solutions\FlexScan3D 3 \Calibrations
11. Load Calibration02
12. Create Project03
    - Threshold [90%]
    - Clean up → Aggressive
    - Mode → Standard
    - (Delete always testing scans before close Flexscan 3.0)
13. Install DentalCAD, select the Flexscan3.0 folder when required by setup (PWD

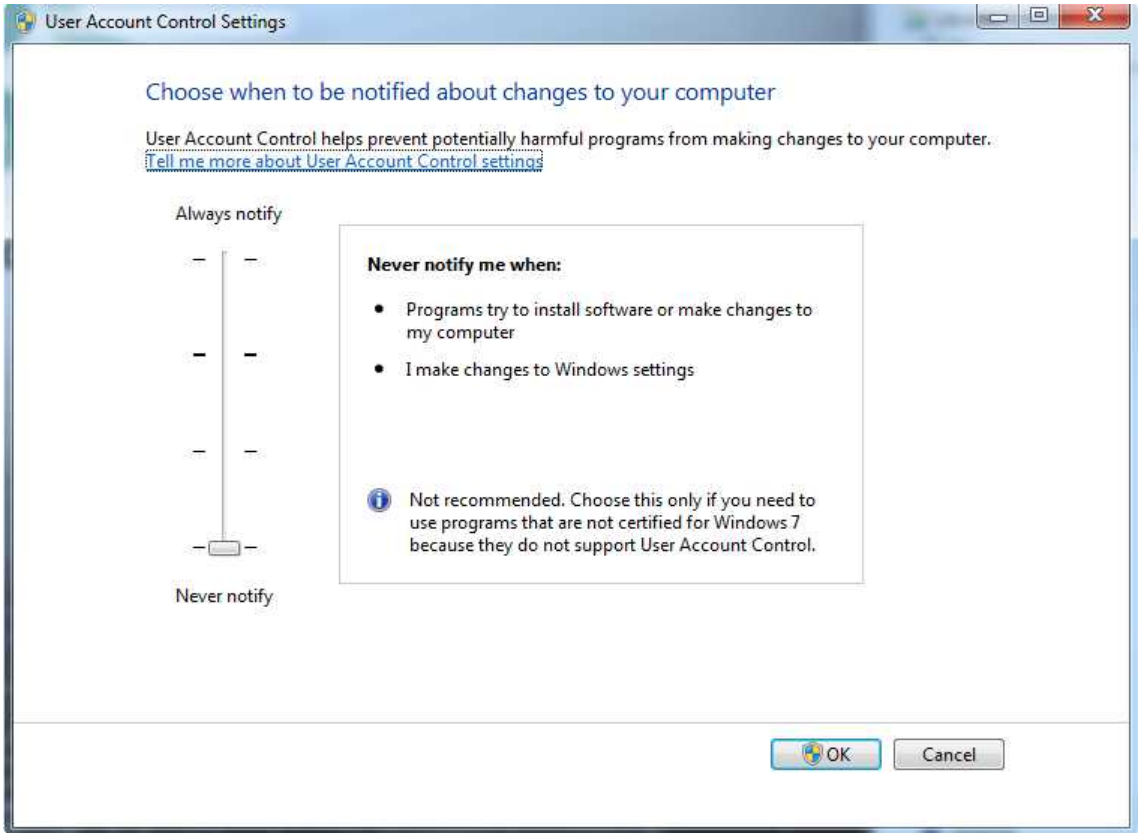
© 2012 Enter your company name

is required)

14. Copy from CD Scanner Calibration.xml file inside C:\Users*YourUser* \AppData\Roaming\EGS\DentalCAD\ScanManOutput folder
15. Run Scanner Software and perform a Reset Axis
16. Run Basic Mode with a model

© 2012 Enter your company name

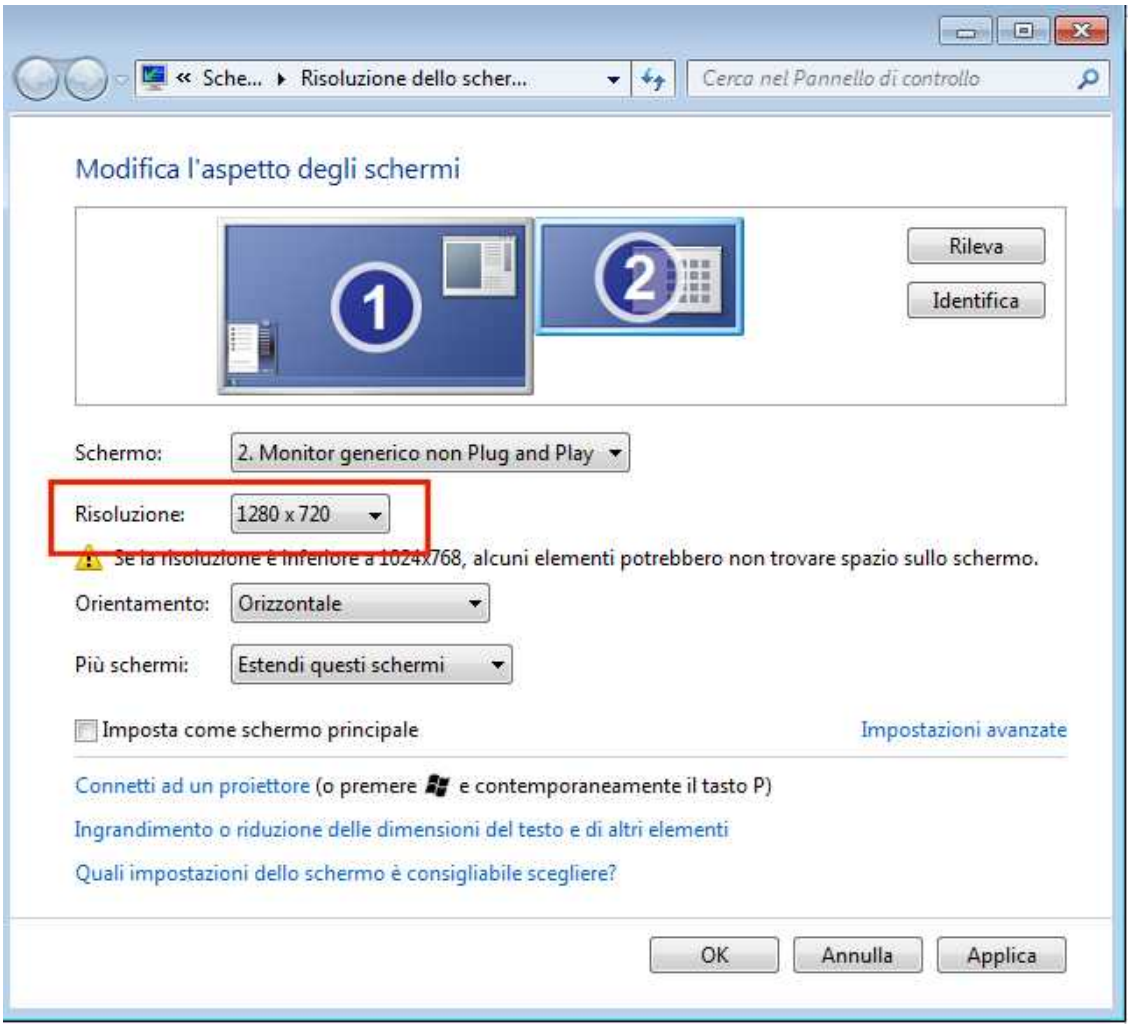
User Acces Control (UAC)


User Account Control Settings
Choose when to be notified about changes to your computer
User Account Control helps prevent potentially harmful programs from making changes to your computer.
Tell me more about User Account Control settings
Always notify
Never notify
Never notify me when:
Programs try to install software or make changes to my computer
I make changes to Windows settings
Not recommended. Choose this only if you need to use programs that are not certified for Windows 7 because they do not support User Account Control.
OK
Cancel

Projector Resolution

Second Monitor one has to have 1280x720 resolution

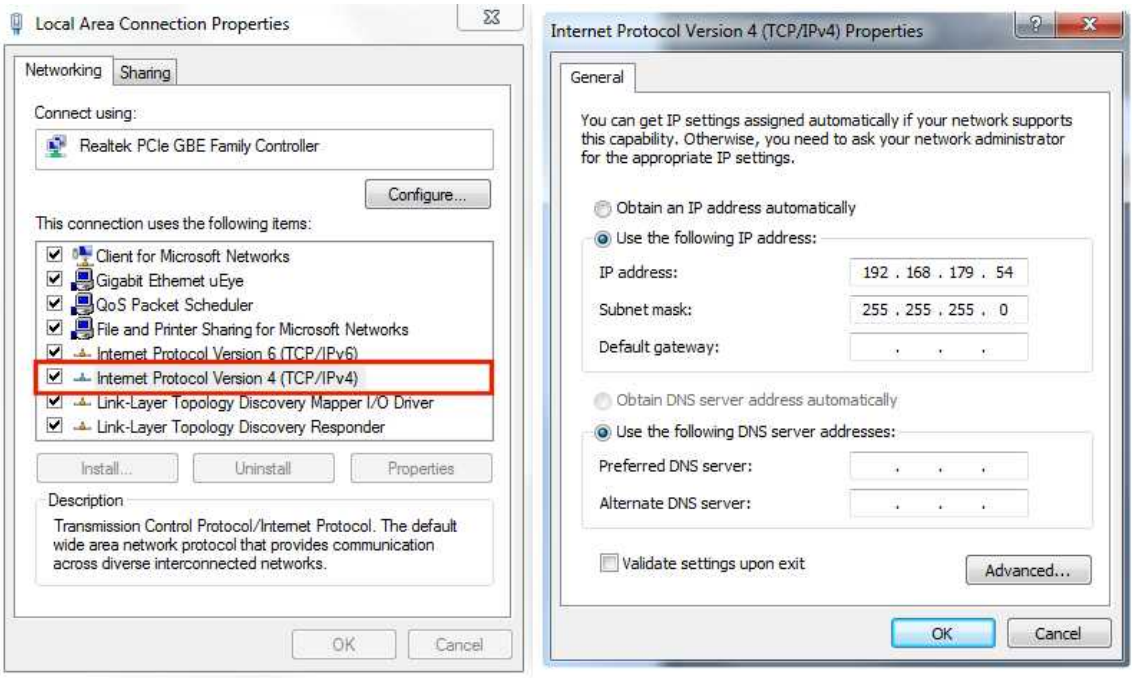
© 2012 Enter your company name



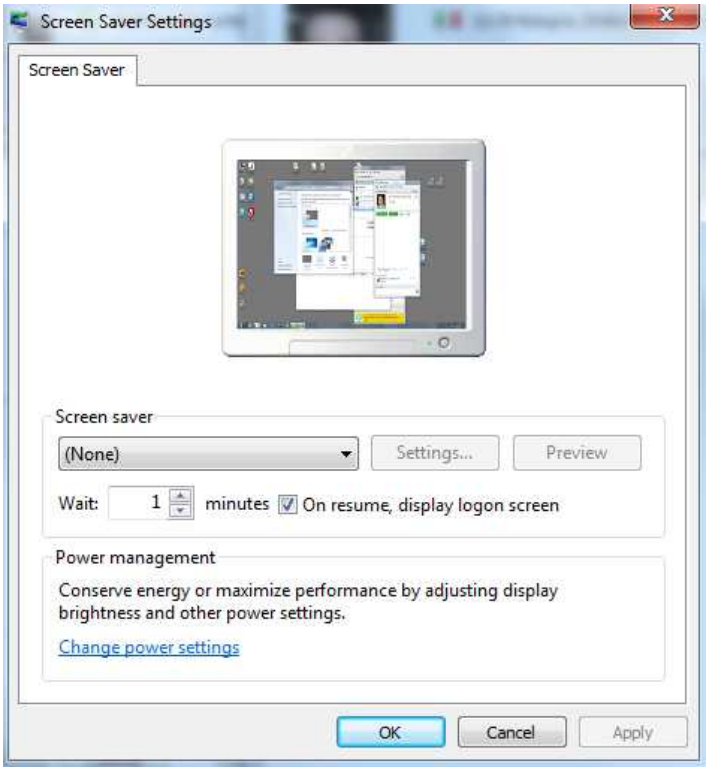
Scanner Network IP

The Ethernet adapter used to connect the PC and the Scanner has to be configured as below:

© 2012 Enter your company name


Local Area Connection Properties
Networking
Sharing
Connect using:
Realtek PCIe GBE Family Controller
Configure...
This connection uses the following items:
Client for Microsoft Networks
Gigabit Ethernet uEye
QoS Packet Scheduler
File and Printer Sharing for Microsoft Networks
Internet Protocol Version 6 (TCP/IPv6)
Internet Protocol Version 4 (TCP/IPv4)
Link-Layer Topology Discovery Mapper I/O Driver
Link-Layer Topology Discovery Responder
Install...
Uninstall
Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
OK
Cancel
Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 179 . 54
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

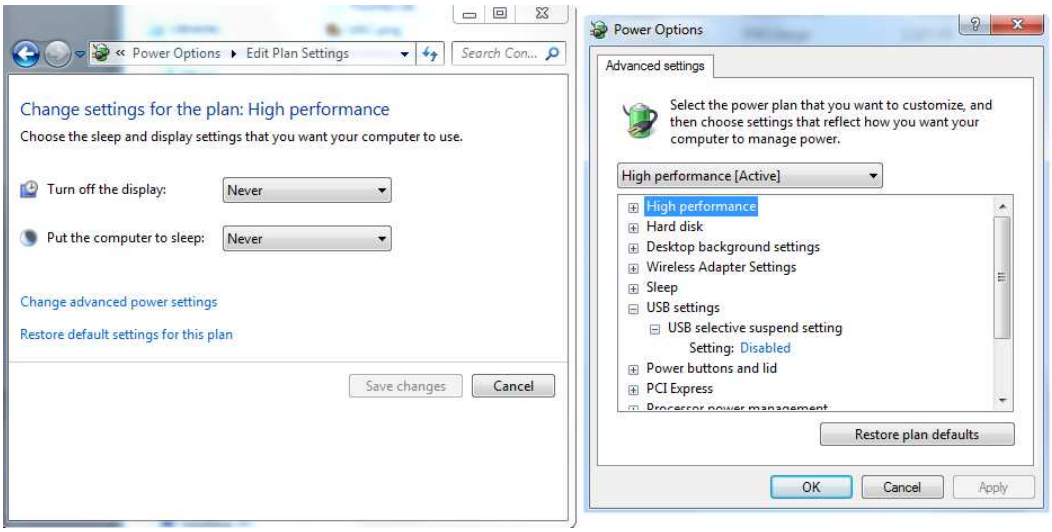
Screen Saver Status



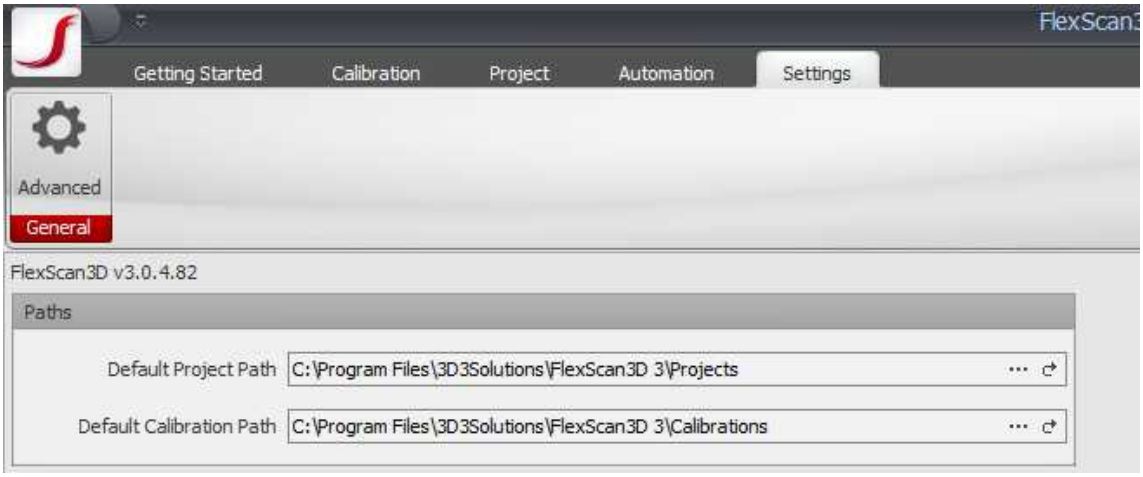
© 2012 Enter your company name

Power Saving setting

The profile has to be set as: **High Performance**



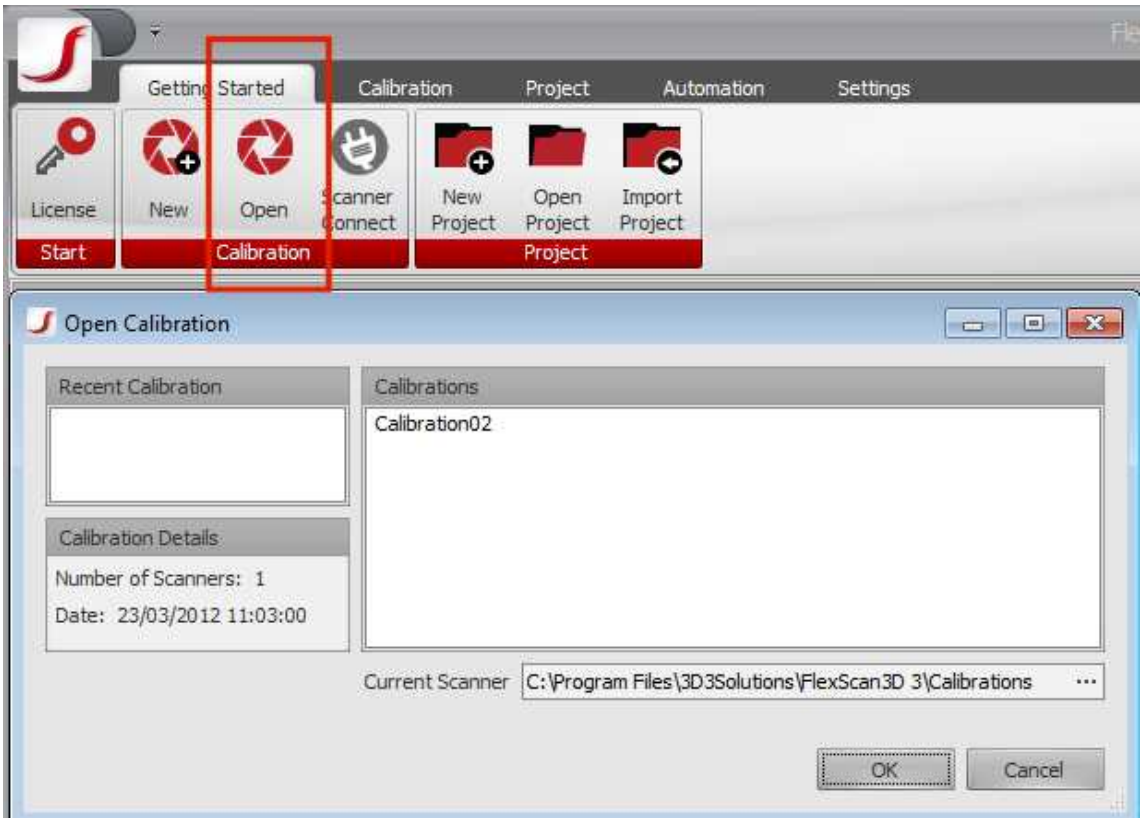
Flexscan 3D 3 Settings



Flexscan 3D 3 Load Calibrations

© 2012 Enter your company name

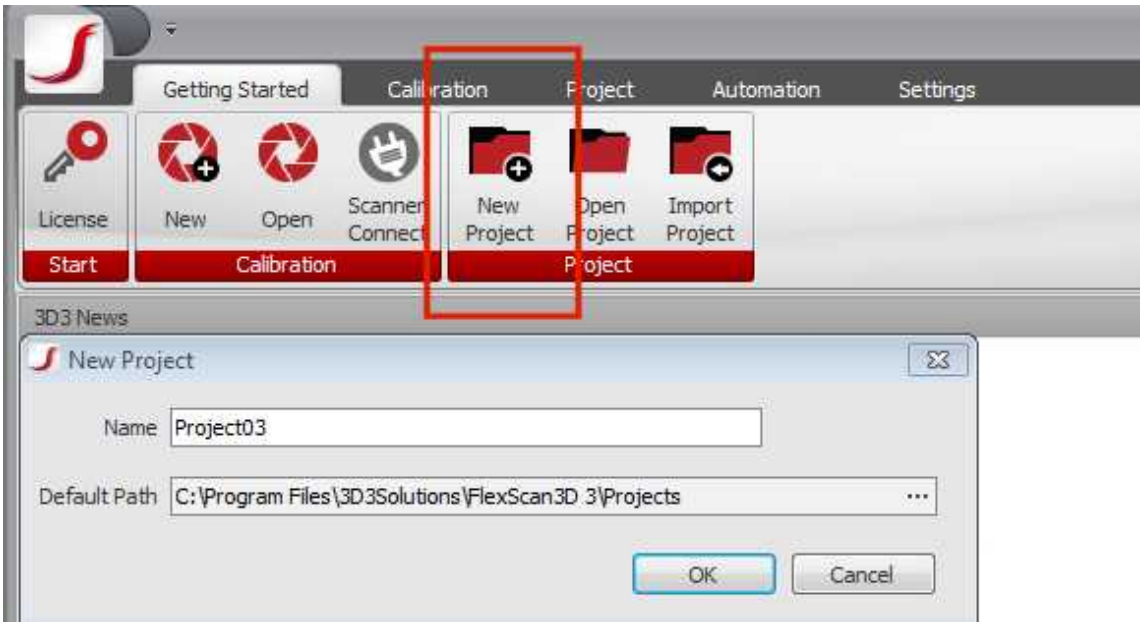
Load the Calibration02



Flexscan 3D 3 Project03

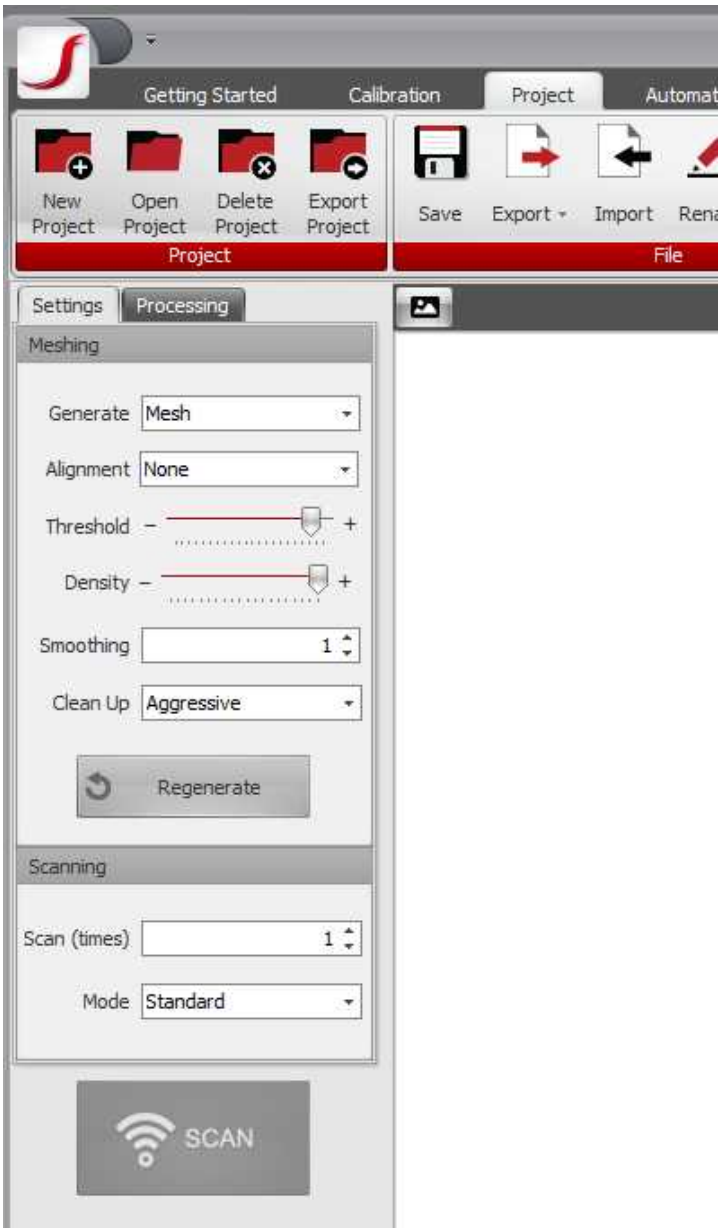
Create a New Project03

© 2012 Enter your company name



- Threshold [90%]
- Clean up → Aggressive
- Mode → Standard

© 2012 Enter your company name



© 2012 Enter your company name

2.6 Reset Axes

Reset axis command have to be used every time the scanner stops and the rotary table is not properly oriented.

Warning: Do not insert any model in the Scanner to perform an Reset Axes!

1. Double click on **Dscan** icon
2. Select Basic Scanner Mode
3. Click Cancel in the Basic Mode Scan dialog box
4. In the Drop down menu click on Tool -> Reset Axes

In a few second the movable plate start to rotate and tilt. After some rotations it stops automatically properly aligned

© 2012 Enter your company name

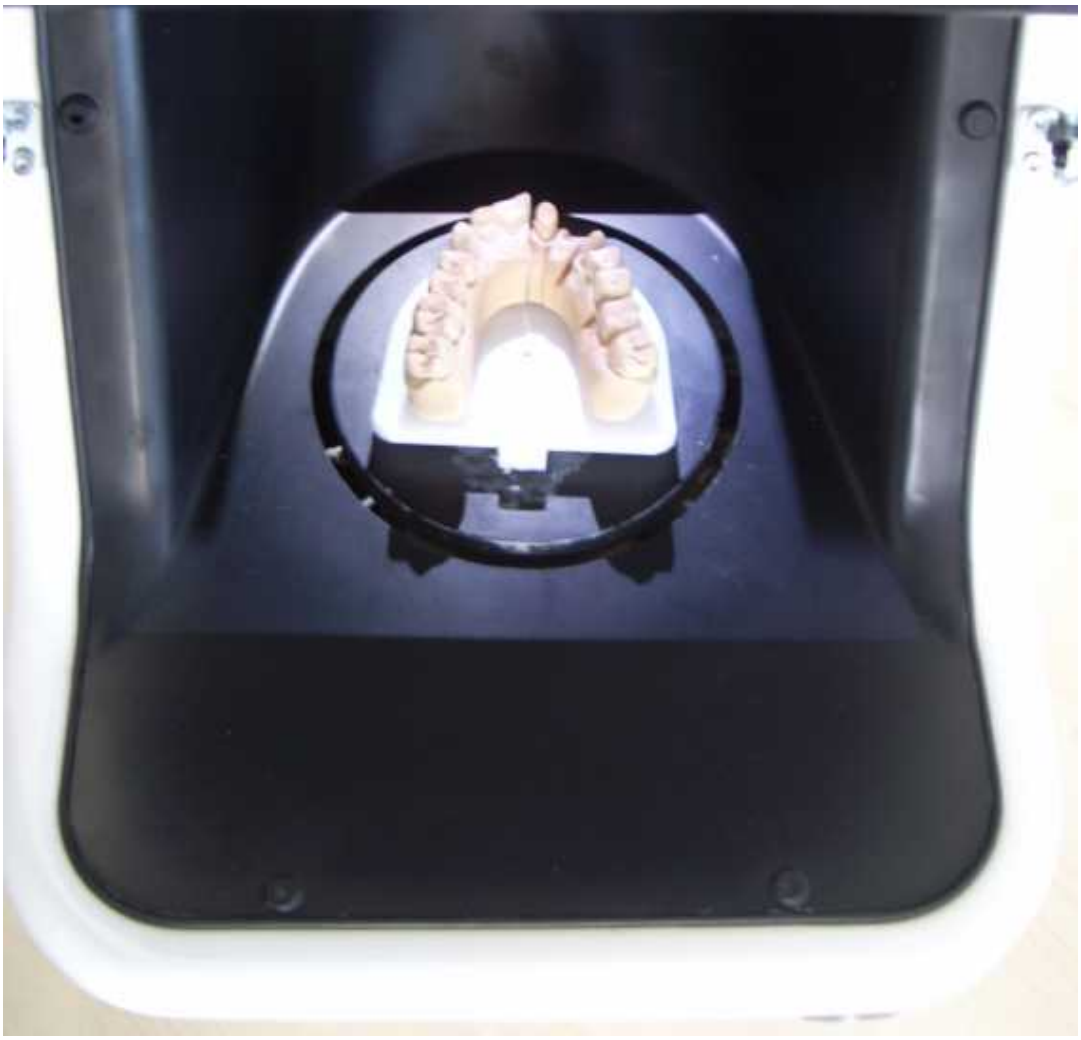
2.7 Basic Mode Scan

The Basic Mode is a general purpose acquisition cycle used to test the scanner or to acquire a very simple model. For a more detailed description see Basic Mode

1. Fix a model on the flat circular plate using Blu Tack adhesive. The incisors teeth have to be oriented as below

2. Insert the flat circular plate in the scanner, Incisors to the back of the scanner

© 2012 Enter your company name



3. Click Green arrow button in top left corner. The Scan Dialog box appears

© 2012 Enter your company name

4. Click on Scan button. The scan starts. After the first 3 acquired images points should be visible on the graphic area

5. When Finalize button becomes active click it to transform points in a mesh

The Scan can be interrupted using the red square button: . If you stop the Scanner the movable plate will be moved to zero position automatically

© 2012 Enter your company name

3 DScan User's Guide

Dscan can run in two main ways:

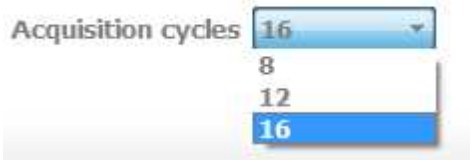
1. Basic Mode
2. Job Driven Mode
    1. Loading manually a Job Definition file
    2. Invoked automatically from a CAD application

© 2012 Enter your company name

3.1 Basic Mode

Basic Mode is simple way to run the scanner in order to scan a model without defining a specific strategy. It is possible to acquire model not related to dental application.

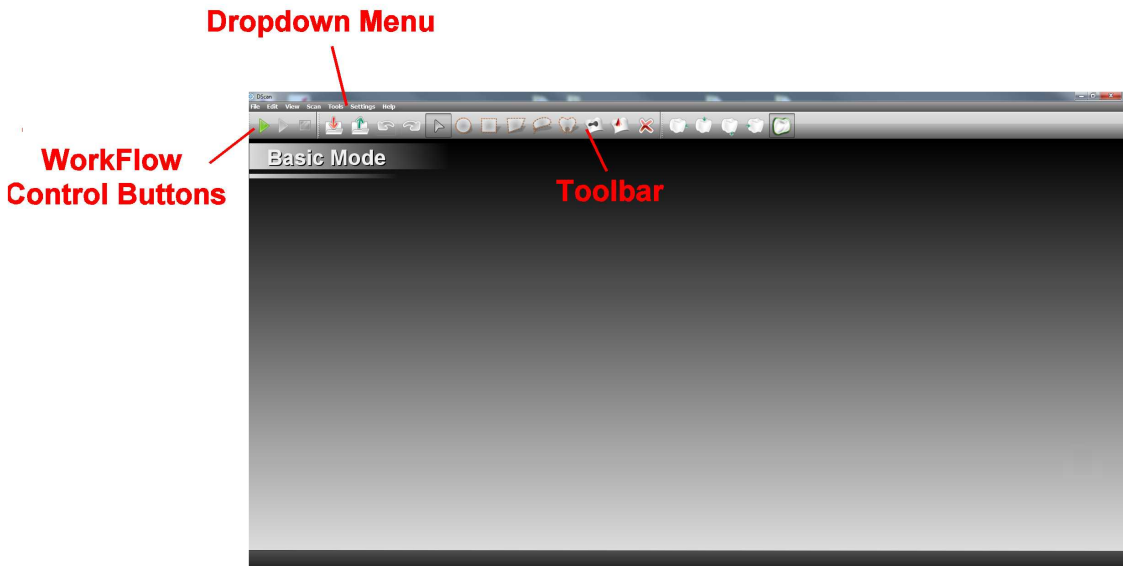
By default a 16 positions cycles is used but this can be changed depending from the complexity of the object to acquire.



© 2012 Enter your company name

3.1.1 UI Elements

Basic Mode general UI layout is showed below:



UI Elements include:

- Workflow Control Buttons
- Toolbar Commands

3.1.1.1 Workflow Control Buttons

Top Left there is the WorkFlow buttons toolbar

Actions Buttons

When active (Green) a Scan Step will be executed

© 2012 Enter your company name

When active (Red) a Scan Step is running. Using this button it is possible to stop the Scanner. It immediately stops to acquire data and returns in zero axis position

When active (Yellow) a Finalize computation is performed. Points acquired by the scanner become meshes

3.1.1.2 Toolbar Commands

In the following, for each command of the toolbar, from left to right, a brief description is provided.

3.1.1.2.1 Import Files

An Open file dialog pop up allowing the user to load multiple STL files in the scanner

3.1.1.2.2 Export Files

An Export Files dialog pop up allowing the user to export multiple STL files from the scanner

3.1.1.2.3 Undo/Redo

Undoes or Redoes last operation

© 2012 Enter your company name

3.1.1.2.4 Mesh Selectors

- Disabled selection: Switch to this tool when you want to simply navigate on model without any active selector
- Point selection: allows to select all the triangles inside a small circular region
- Rectangle selection: allows to select all triangles inside a rectangular region
- Polygon selection: allows to select all triangles inside a polygonal region
- Lazo selection: allows to select all triangles inside a free-hand closed region
- Cluster selection: selects all triangles in the picked cluster

3.1.1.2.5 Fill holes

Fills the holes in the mesh

3.1.1.2.6 Spike Removal

Flatten the triangles in a small area defined by polygon selection

© 2012 Enter your company name

3.1.1.2.7 Delete Selected triangles

Removes all the selected triangles

3.1.1.2.8 Standard Views

Sets the viewport to a standard direction

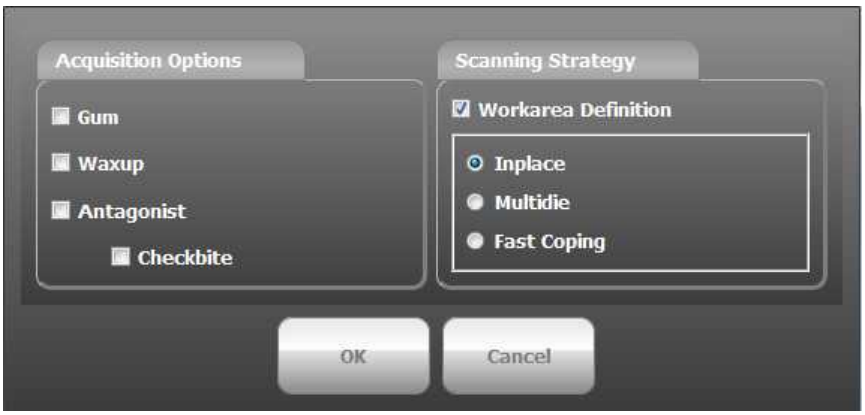
3.1.1.2.9 Show/Hide Mesh Borders

Graphical display option for showing or not the borders of the mesh in highlight

© 2012 Enter your company name

3.2 Job Driven Mode

Upon starting the Scanner prompts the user to choose the acquisition Options and the scanning Strategy to use



Three Strategies are available:

- Inplace: Standard strategy. The job stumps stay in the original position during scanning. No realign is required
- Multidie: Alternate strategy. The job stumps are positioned on a special device. They need to be realigned manually later
- Fast Coping: it is particularly useful when a single Stump has to be scanned

The below Options allows the user to add elements to scan:

- Gum
- Waxup
- Antagonist

Workarea definition flag force the scanner to focus on a specific arc jaw area avoiding to acquire the entire model saving computational time

© 2012 Enter your company name

3.2.1 Acquisition Workflow

Depending from the strategy and option selected, the **Dscan** sets several Steps in order to acquire the arc jaw model and related stump in the best possible way. This sets of Steps are called **Acquisition Workflow**. To help the user to navigate in the workflow a wizard like UI is provided. There are three type of Steps used by scanner to make an Acquisition Workflow:

1. **Scan Step**: The model is scanned using several positions depending from the specific Step. After a Finalize meshes are created. Obviously an arc jaw, a tooth or other models have to be inserted in the scanner by the user
2. **Registration Step**: Meshes are aligned each other. The alignment requires to select three points on a fixed mesh and the homologous ones on a movable mesh. The application compute the transformation in order to minimize the distances. In order to align to mesh they have to have overlapping areas. It is not possible to align meshes without overlapping
3. **Assignement Step**: Meshes are segmented and assigned to the appropriate teeth

For example below are listed the Steps to acquire a simple job using Inplace strategy and Workarea flag on. No additional options selected

1. Workarea Definition
2. Total Model Acquisition
3. Neighbors
4. Inplace
5. Registration
6. Finish

The same Workflow adding Gum Option:

1. Workarea Definition
2. Total Gum Acquisition
3. Total Model Acquisition
4. Gum Registration
5. Gum
6. Neighbors

© 2012 Enter your company name

7. Inplace
8. Registration
9. Finish

In the following sections Steps are described in details

© 2012 Enter your company name

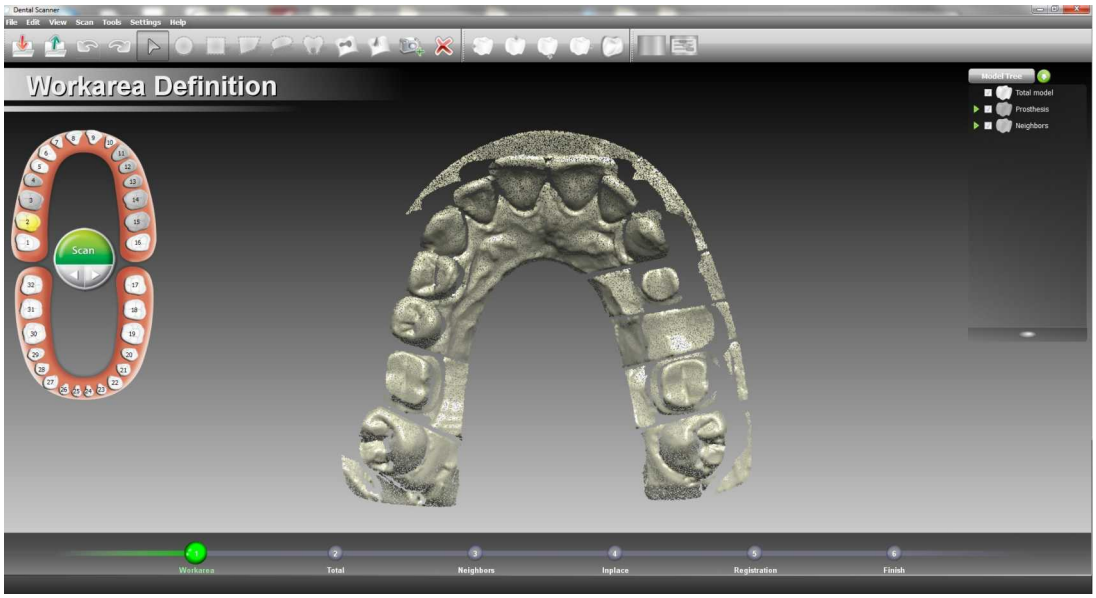
3.2.1.1 Workarea Definition

The Workarea Definition is a Scan Step. Ii has the goal to focus all the scanning and computation effort to a specific arc jaw area avoiding to acquire the entire model saving time

Workarea Definition
Insert the jaw model into the scanner tray and press the Scan button when ready. Afterward select the teeth relative to the workarea.
Acquisitions number
Default
Scan
Cancel

Workarea Definition

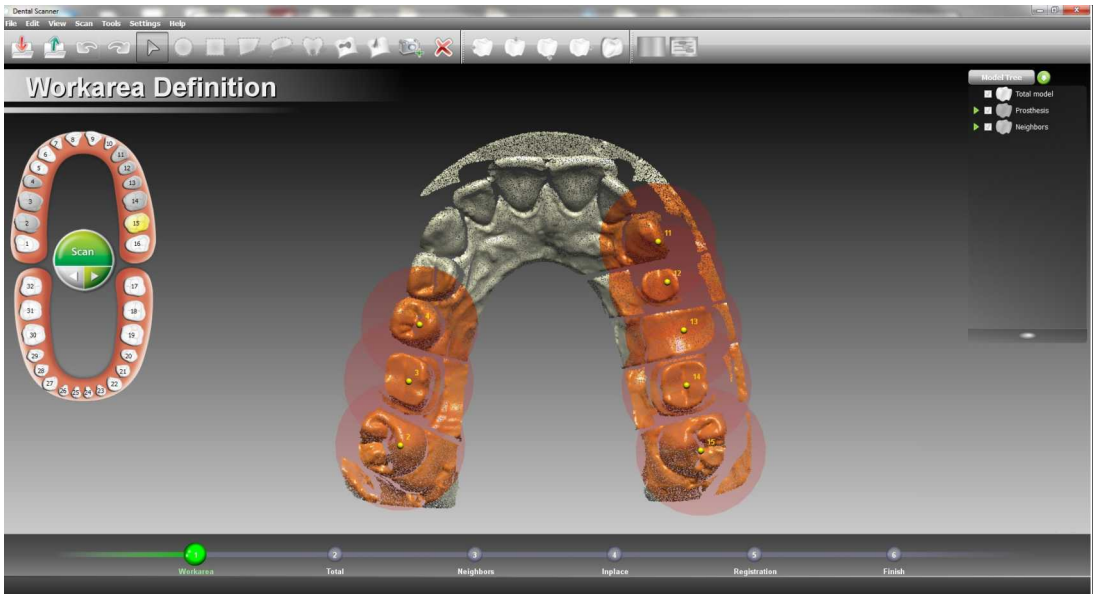
1. Quick acquisition, only 2 positions by default, of the total model is done. No Finalize is required



2. Teeth segmentation and linking. When all the teeth are linked to a workarea, the step is completed. In this step the top view is blocked, and only panning is

© 2012 Enter your company name

allowed.



© 2012 Enter your company name

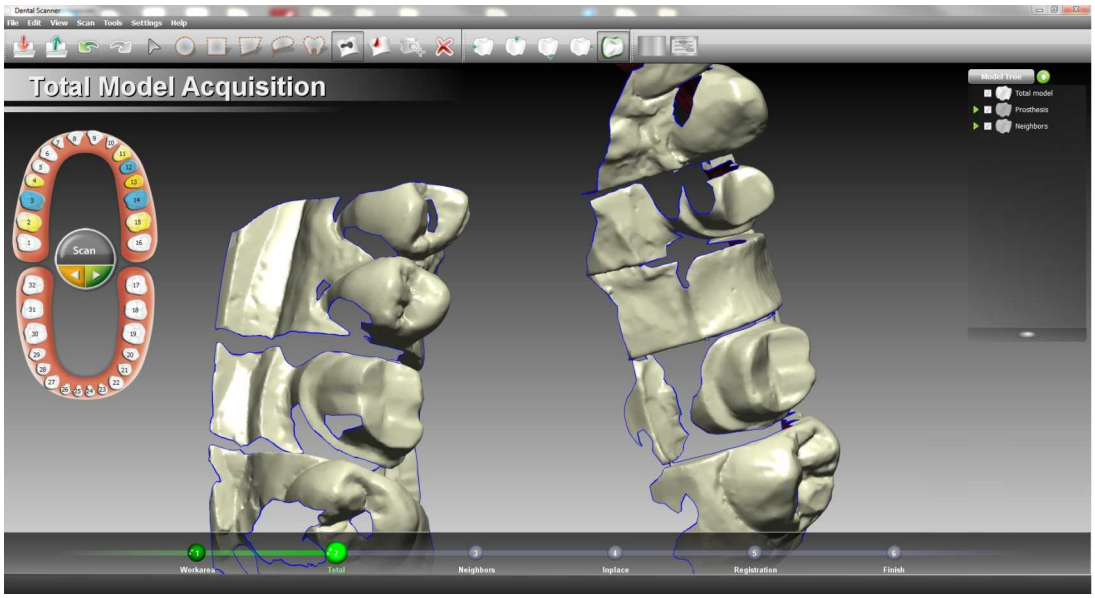
3.2.1.2 Total Model Acquisition

The Total Model acquisition is a Scan Step. It is used for two purposes:

1. Neighbors and Pontic element definition
2. Reference for other acquisition Steps

Total Model Acquisition

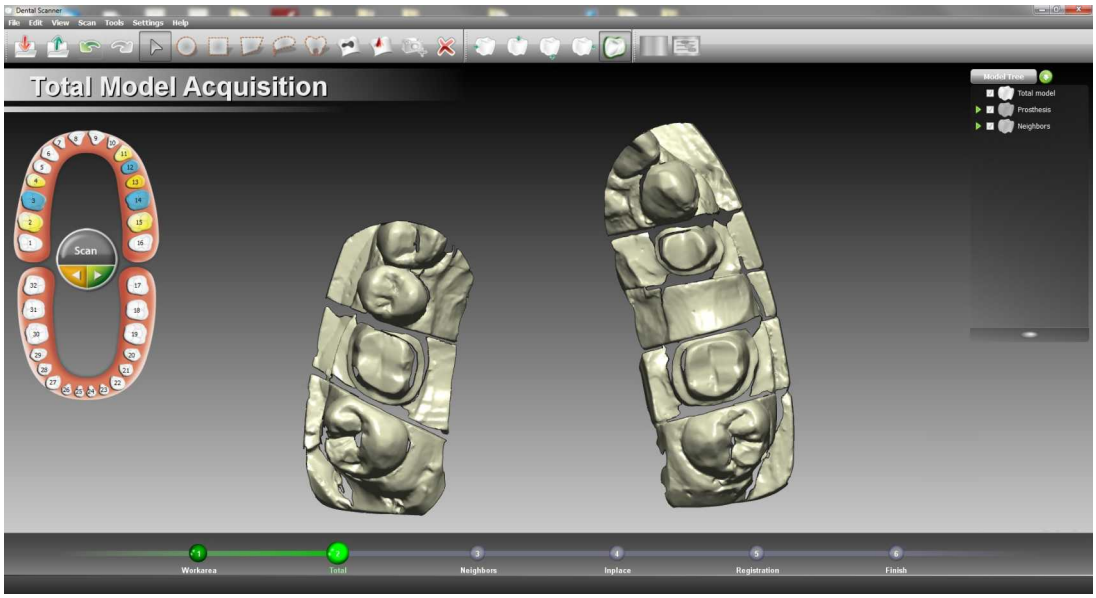
1. Detailed acquisition, 8 positions by default, of the previously defined workarea. To finish the acquisition a Finalize is required



2. Upon completion of the acquisition it's possible to use the Fill Holes or Spike

© 2012 Enter your company name

removal tool to heal the mesh. When no further editing is needed, the step is completed



© 2012 Enter your company name

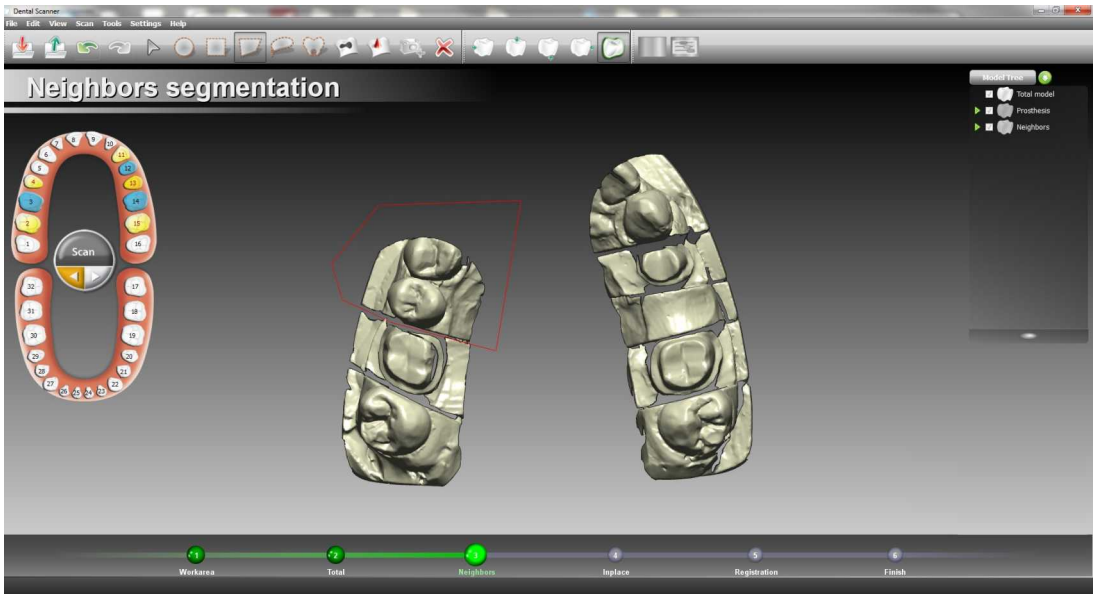
3.2.1.3 Neighbors

Neighbors is an Assignment Step. A manual segmentation is needed to identify all the neighbors and pontic elements in the Total Model acquisition.

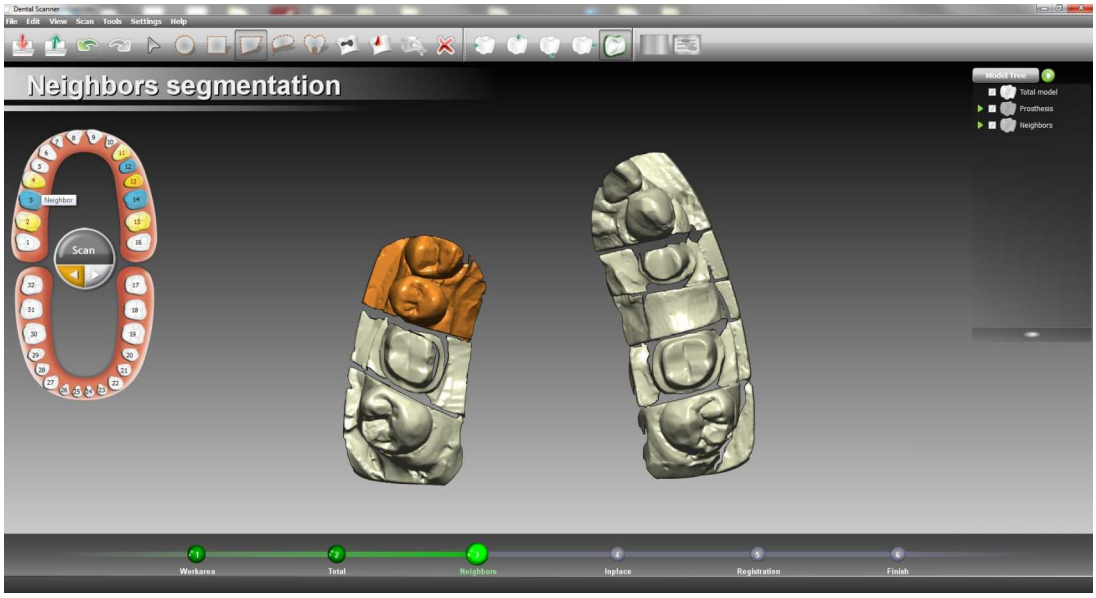
This step is usually performed using the polygon and the lasso selection tools.

Neighbors segmentation

1. Correct manual segmentation of the single meshes:

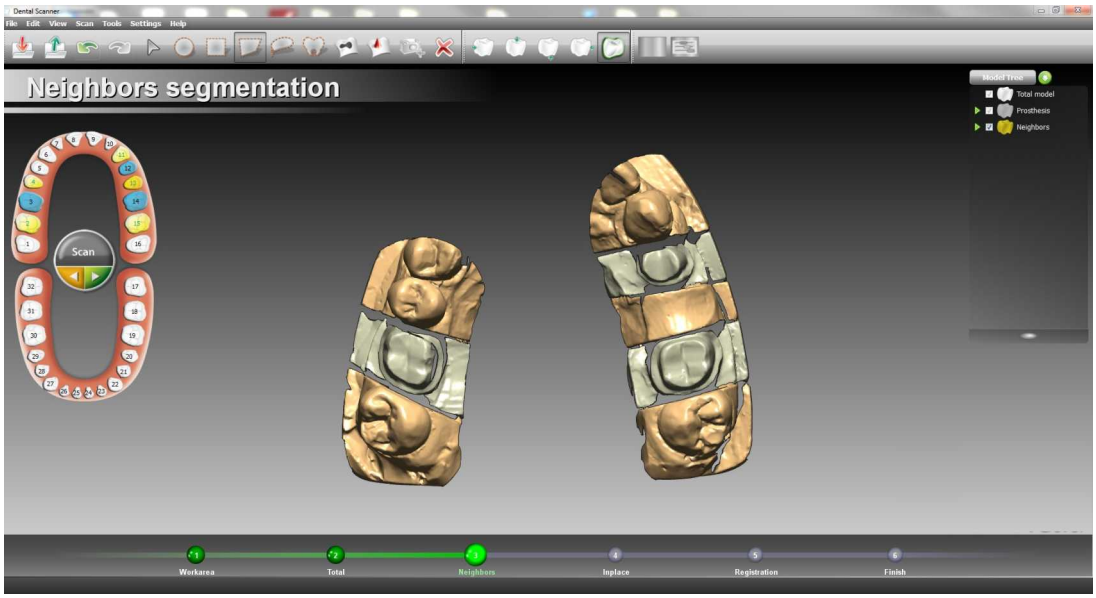


2. Linking of the segmented meshes to the preparation elements; pick the segment and the arcjaw teeth by single click to link;



© 2012 Enter your company name

3. Correctly linked elements are shown in pale orange; unlinked elements are shown in bright orange. Once all elements have been correctly linked the step is complete.



© 2012 Enter your company name

3.2.1.4 Inplace

Inplace

The Inplace is a Scan Step. This strategy implies keeping the stumps on the base, while removing all the other elements. Stumps scanned this way are already in the right position, no additional step are required

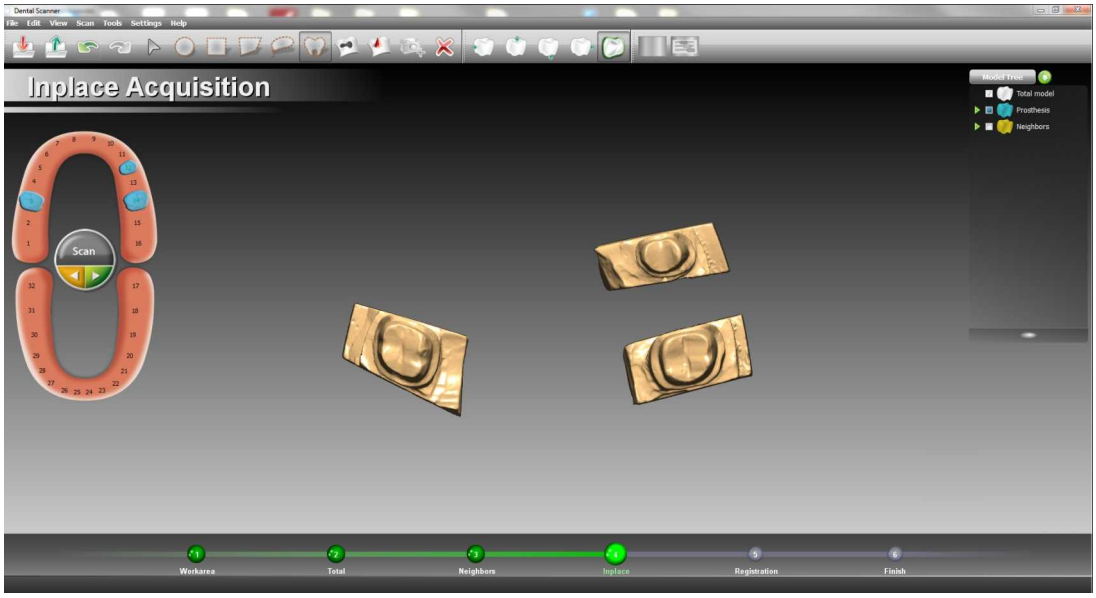
If the preparation involves several stumps the scanner automatically could split the acquisition in two or more separate Steps

Inplace workflow

1. Acquire the stumps, 16 positions by default. A Finalize is required. Elements scanned this way are already registered with the total acquisition:

© 2012 Enter your company name

2. Link the elements; pick the segment and the arcjaw teeth by single click to link



If one tooth is not well acquired don't assign it. Remove from the base the right ones and repeat the scan running it from pulldown menu. (The Scan button is inactive)

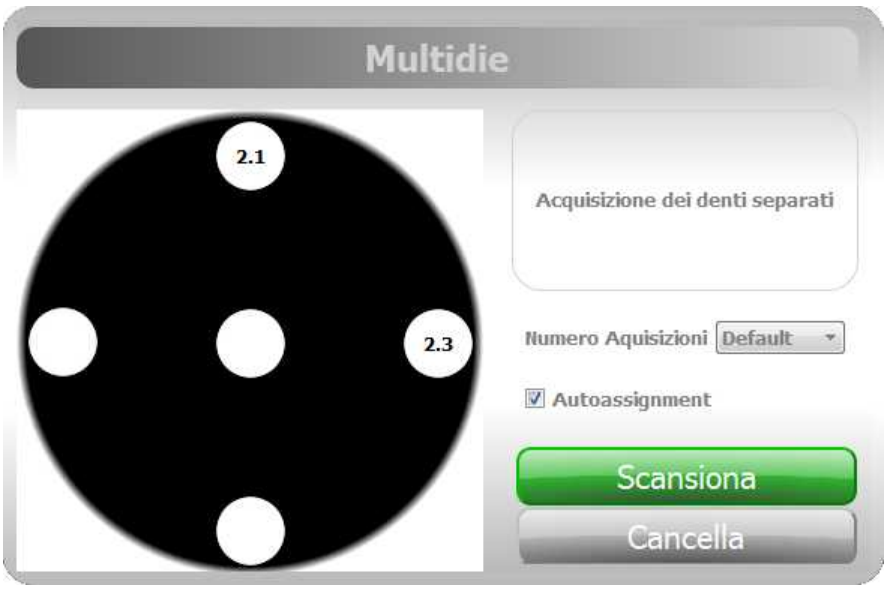
Dscan deletes automatically the not assigned mesh and repeat the acquisition cycle

© 2012 Enter your company name

3.2.1.5 Multidie

Multidie

Multidie is a Scan Step. This strategy implies removing the stumps from the base and inserting them into a special tablet, according to a specific pattern. The stumps are scanned in a different position respect the arc jaw, an additional registration step is required and mandatory to move them in the right position. As reference the Total Model is used



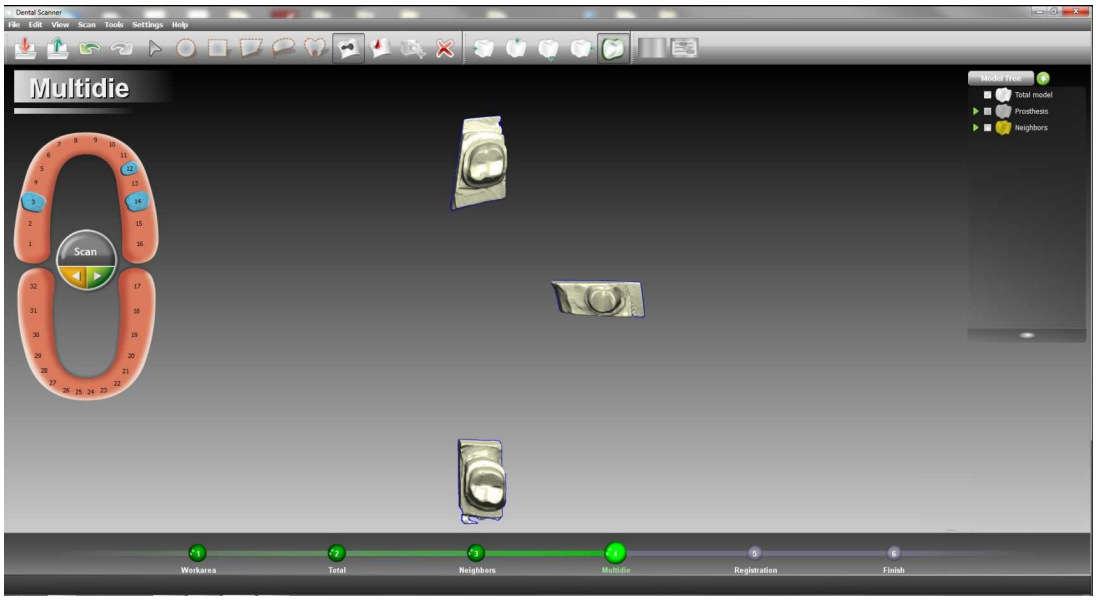
.

If the preparation involves more than five stumps the scanner automatically split the acquisition in two or more separate Steps

Multidie workflow

1. Acquire the multidie support, 16 positions by default. A Finalize is required to finish. The meshes are assigned automatically by **DScan** if the flag Autoassignment is on

© 2012 Enter your company name

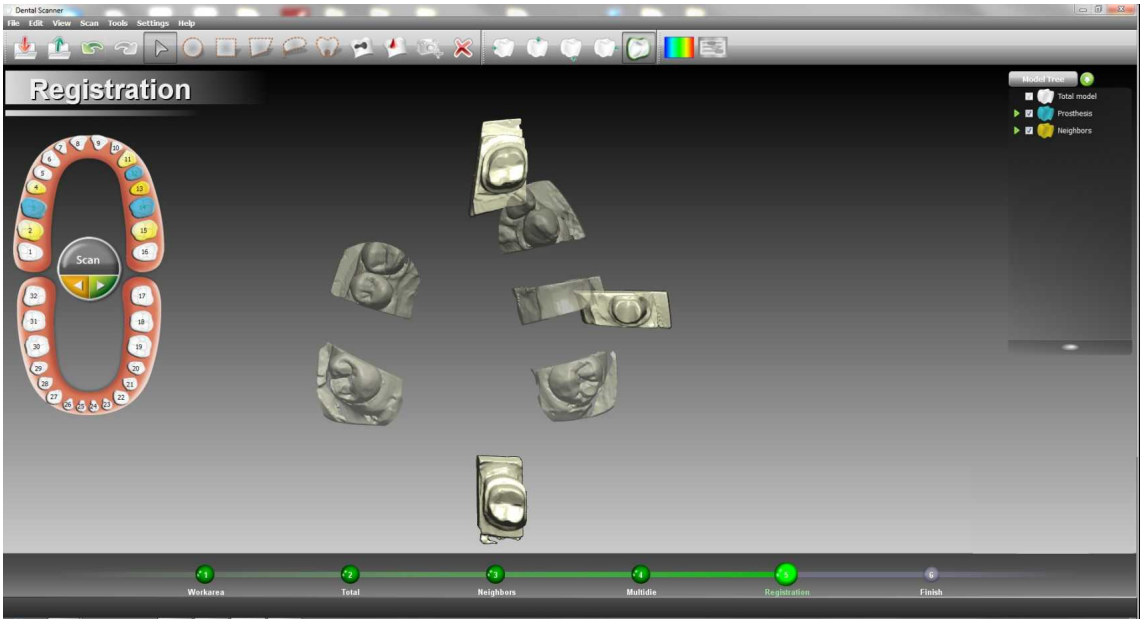


If one tooth is not well acquired deassign it clicking on the related arc jaw icon. Remove from the rotating tablet of the scanner the right ones, move just a little the wrong stump and repeat the scan running it from pulldown menu. (The Scan button is inactive). When the multidie scan dialog box appears unflag the Autoassignment . **Dscan** deletes automatically the not assigned mesh and repeat the acquisition cycle

© 2012 Enter your company name

3.2.1.6 Registration

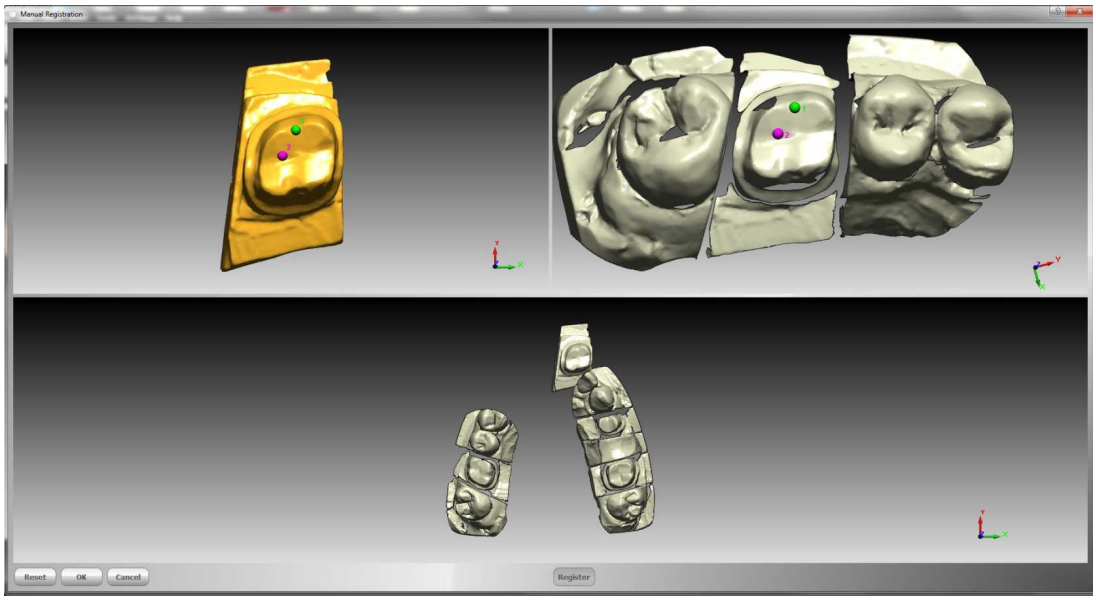
Registration has the goal to align meshes to other one. Usually stumps or waxup are aligned using Total Model. Registration Step is mandatory for stumps acquired using the Multidie approach, and optional for Inplace acquisition.



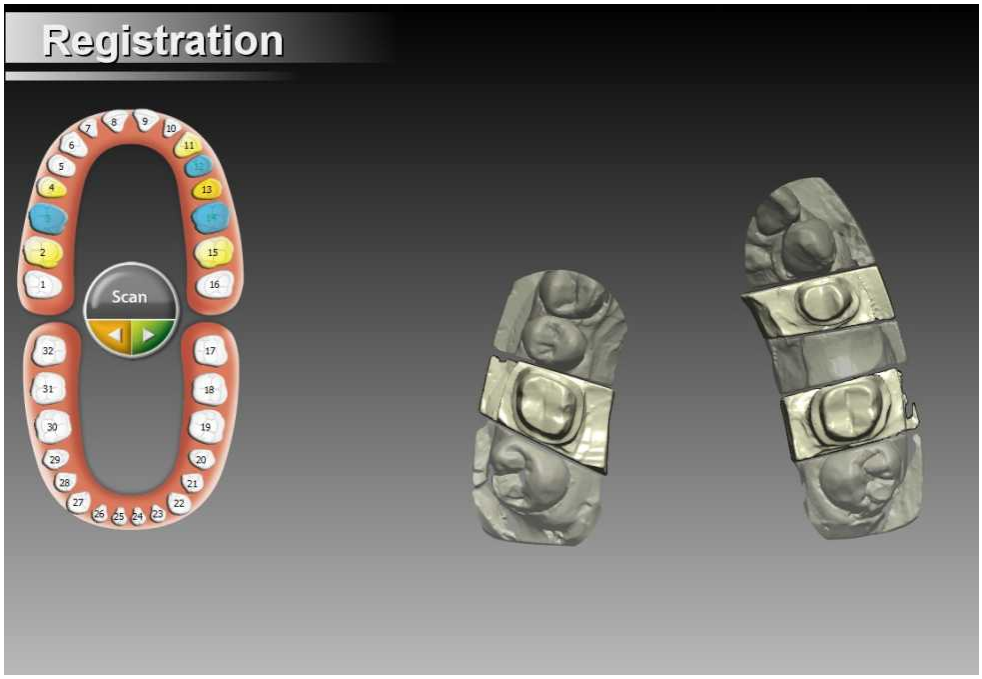
Registration

1. Click in the arc jaw on the tooth to register: A dialog box appears
2. Select three or more homologous points on both the single teeth and the total model. At any time is possible to RESET the selection or ABORT the operation. Once done click the REGISTER button

© 2012 Enter your company name



3. By clicking the OK button the operation is completed. A successfully registered element is shown with a green label in the jaw view:

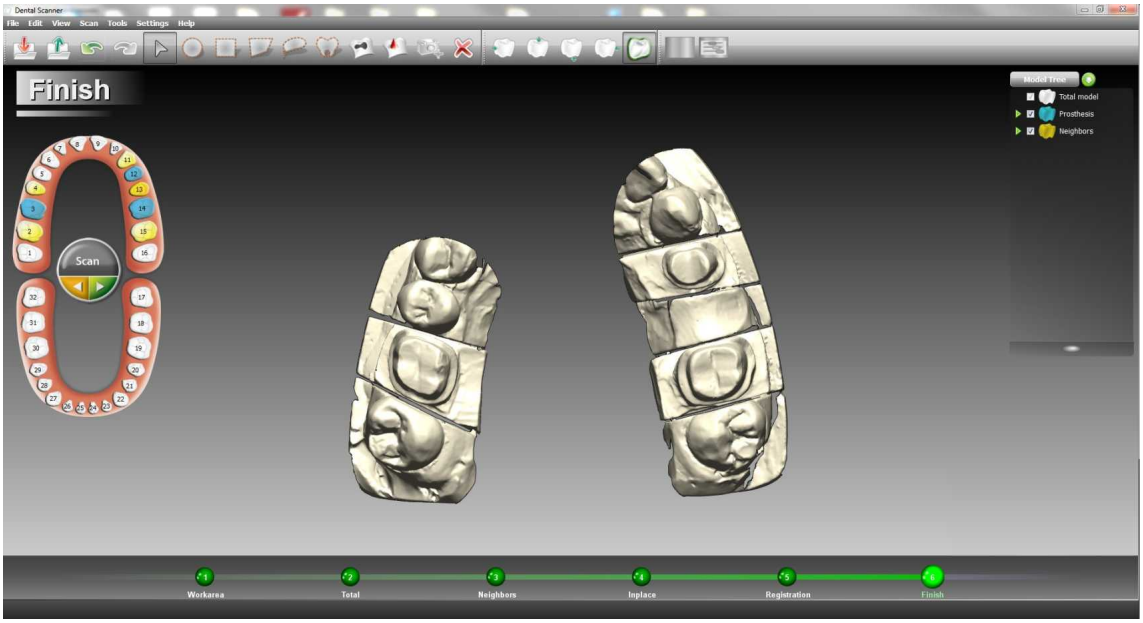


4. Repeat the step for each element to align

© 2012 Enter your company name

3.2.1.7 Finish

When all the Steps in the Acquisition Workflow are done, the scanning process is complete. The Scanner application is ready to move all the data acquired to the Modeling Prosthesis phase. This is automatically done clicking on the NEXT button



© 2012 Enter your company name

3.2.1.8 Gum

When Gum option is checked the Scanner add three Steps to the Acquisition Workflow:

1. Total Gum Model Acquisition
2. Gum Registration
3. Gum Assignment

Total Gum Model Acquisition

Total Model with gum is acquired, 8 positions by default. A Finalize is required

Gum Registration

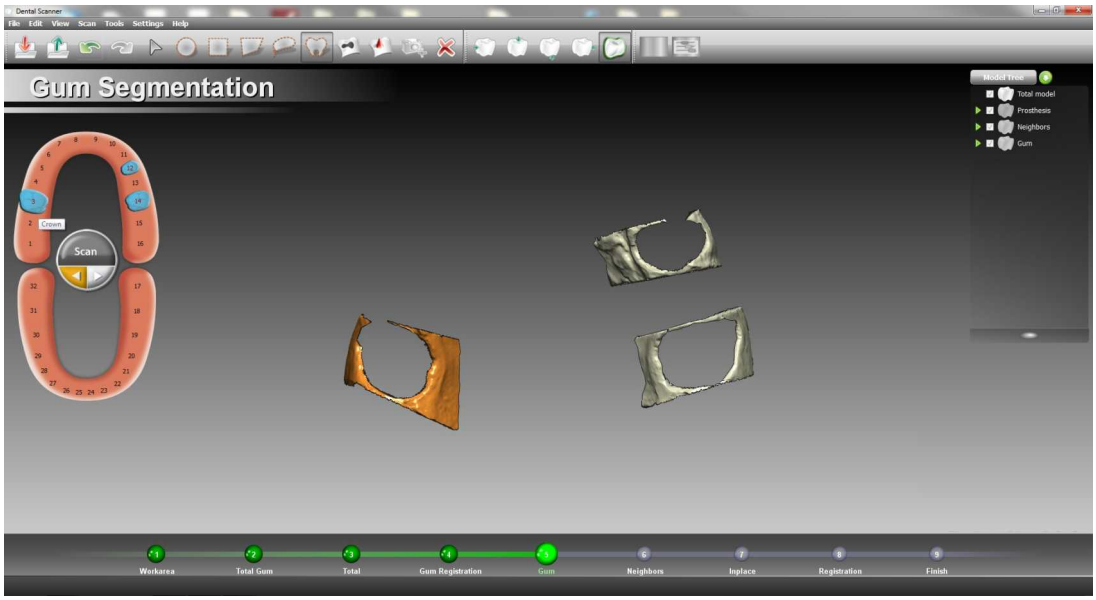
This Step is composed by two parts:

1. A not mandatory Registration of the two total model acquisitions
2. An semiautomatic segmentation. A specific tool for gum identification, accessible via the button , is available. Using this tool and proper scanned total models, it's possible to isolate gum without the need of manual segmentation

© 2012 Enter your company name

Gum Assignment

Segmented gums must be linked to the proper tooth



© 2012 Enter your company name

3.2.1.9 Waxup

When Waxup option is checked the Scanner add four Steps to the Acquisition Workflow:

1. Total Waxup Model Acquisition
2. Total Waxup Model Registration
3. Waxup Acquisition
4. Waxup Registration

The purpose of these Steps is to acquire shape to be used instead of the default ones available from internal **DentalCAD** libraries. It means that some modeling job has to be performed to make the shape acquired compatible. This job is done in the Waxup Acquisition Step mainly using Delete and Fill hole commands

Total Waxup Model Acquisition

Total Model with Waxup is acquired, 8 positions by default. A Finalize is required

Total Waxup Model Registration

A not mandatory Registration of the two total model acquisitions is available if required

Waxup Acquisition

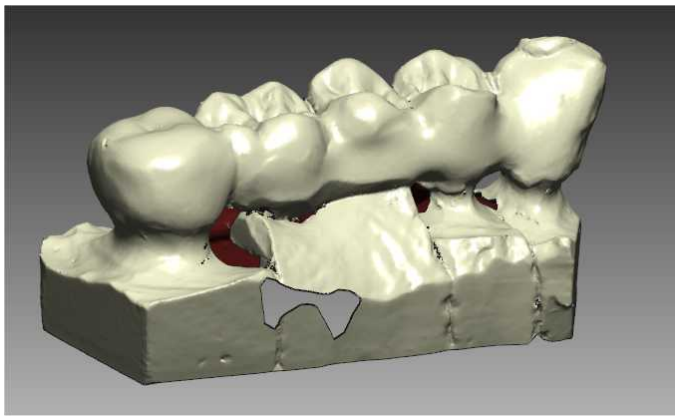
This Step is composed by two parts

© 2012 Enter your company name

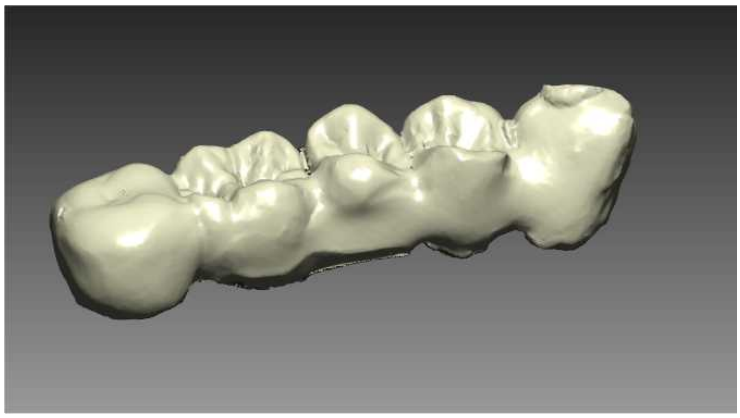
1. The Waxup model is acquired, 5 positions by default. A Finalize is required.

2. Segmentation and element linking is then required. Waxup has to be prepared in order to substitute library elements. It means the Waxup bottom has to have a regular hole in order to be able to connect to the Margin Ring. To achieve this result some modeling jobs is required using Delete and Fill hole commands:

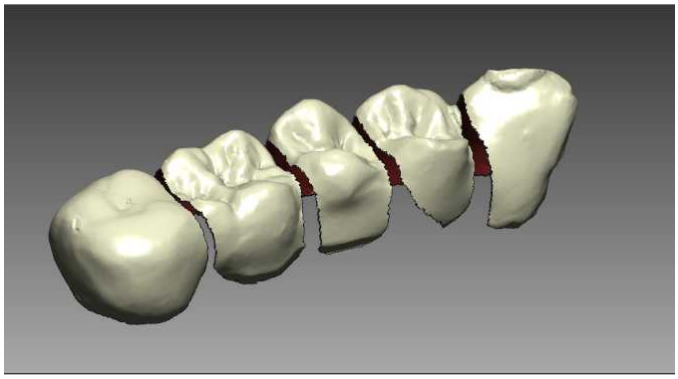
    1. Delete the Waxup support



© 2012 Enter your company name



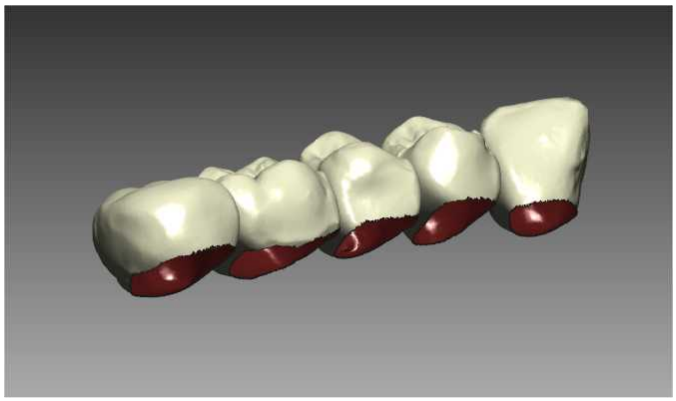
2. Split the total shape in single shapes cutting connectors if present



3. Recreate lateral faces using fill hole command

4. Delete the bottom of the waxup in order to create the base hole

© 2012 Enter your company name



Waxup Registration

A not mandatory Registration of Waxup shapes is available if required. The reference model will be the Total Waxup Model

© 2012 Enter your company name

3.2.1.10 Antagonist

Antagonist

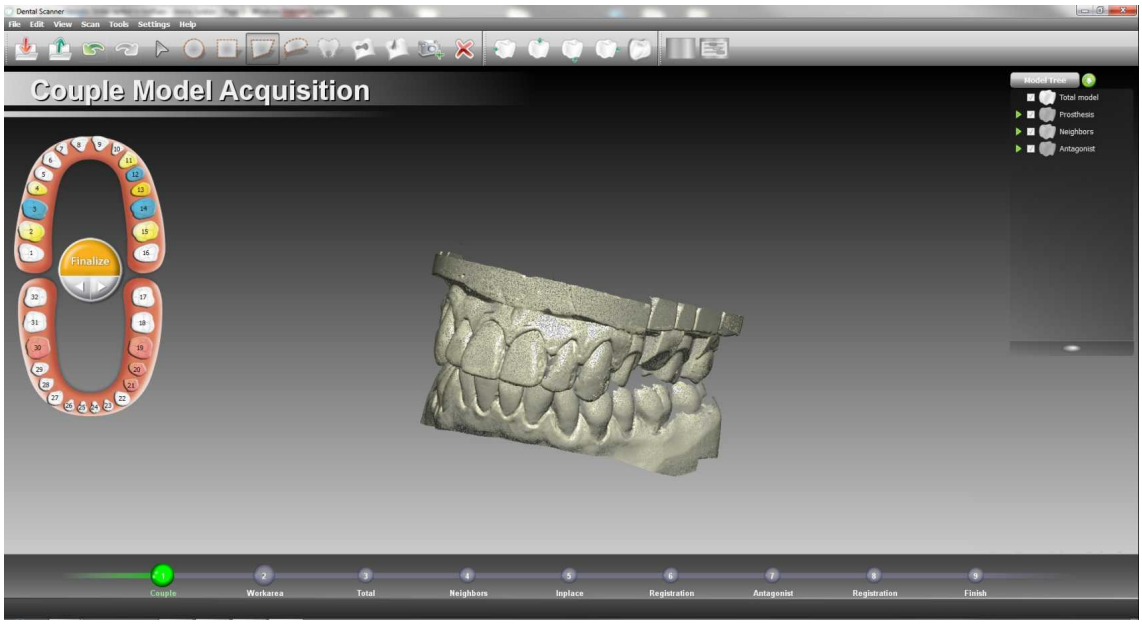
When Antagonists Option only is checked (no checkbite), the Scanner add three Steps to the Acquisition Workflow:

1. Couple Model Acquisition
2. Antagonists Acquisition
3. Antagonists Registration

Couple Model Acquisition

Acquire the Couple Model. A quick acquisition, 6 positions by default, of both arc jaws, superior and inferior, is performed.

© 2012 Enter your company name



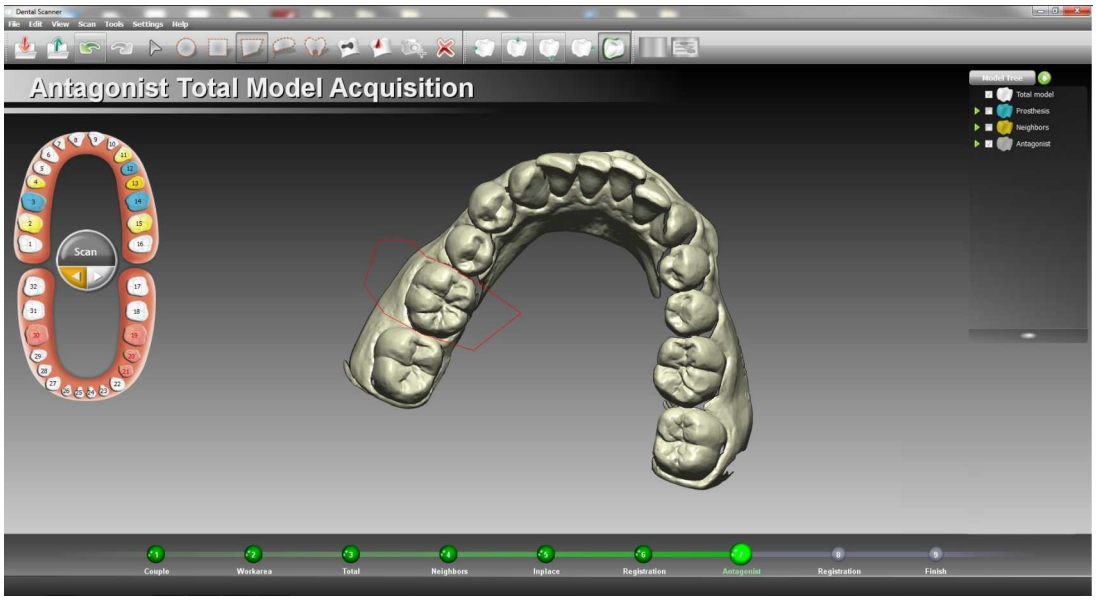
Antagonist Acquisition

Antagonist Total Model Acquisition
Insert the antagonist total model into the scanner tray and press the Scan button when ready.
Acquisition cycles
Default
Scan
Cancel

This Step is composed by two parts:

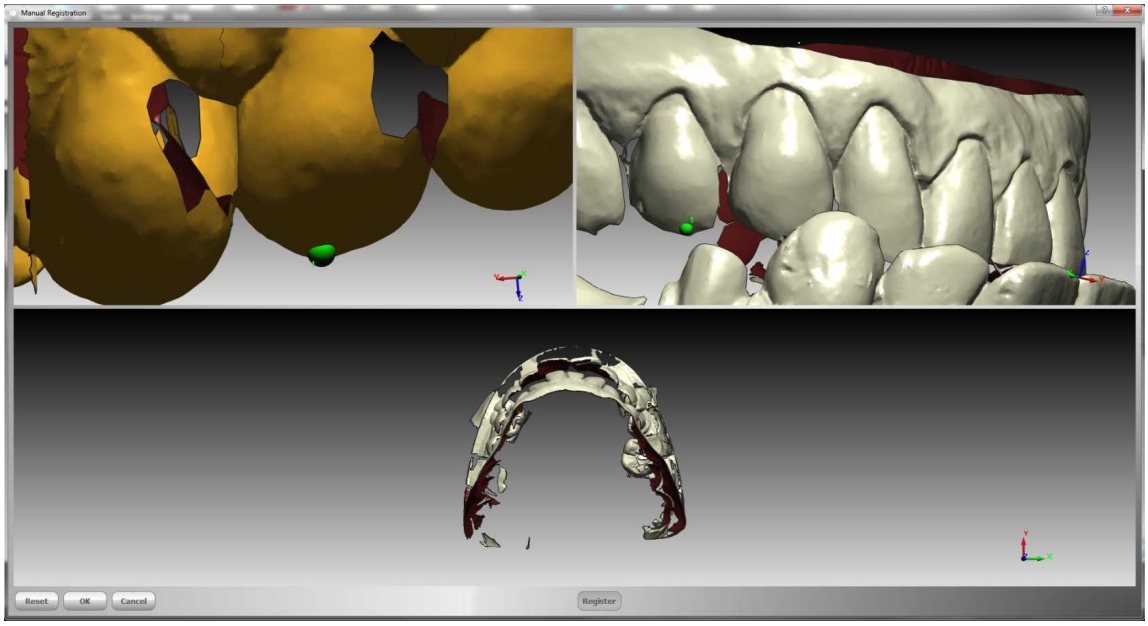
1. The user is required to scan the full antagonists arc jaw, 8 positions by default. A Finalize is required
2. Segmentation and element linking is then required

© 2012 Enter your company name



Antagonist Registration

Perform the registration between the antagonist jaw and the Model Couple by picking the contact points. Once all elements have been correctly registered the step is complete.

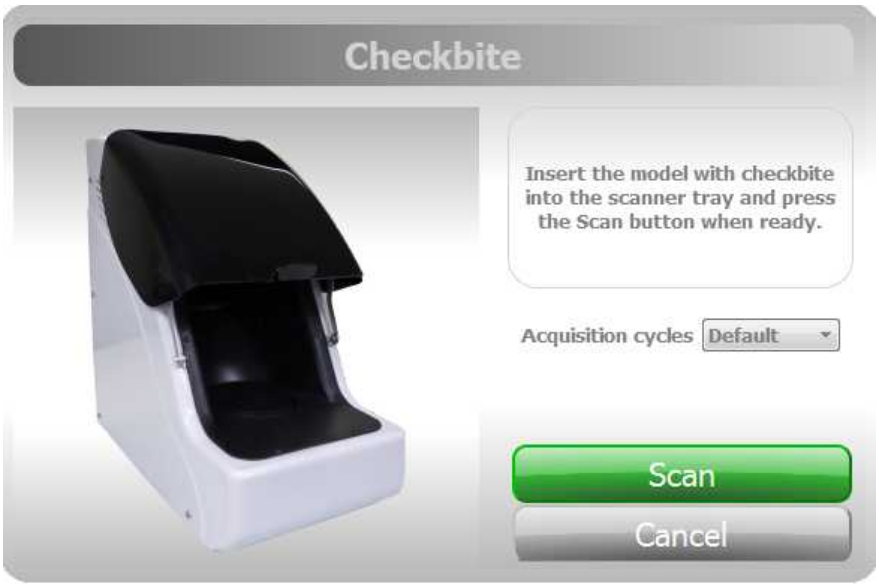


Checkbite

© 2012 Enter your company name

When Antagonist with Checkbite option is checked, the Scanner add one Steps to the Acquisition Workflow:

1. Checkbite acquisition

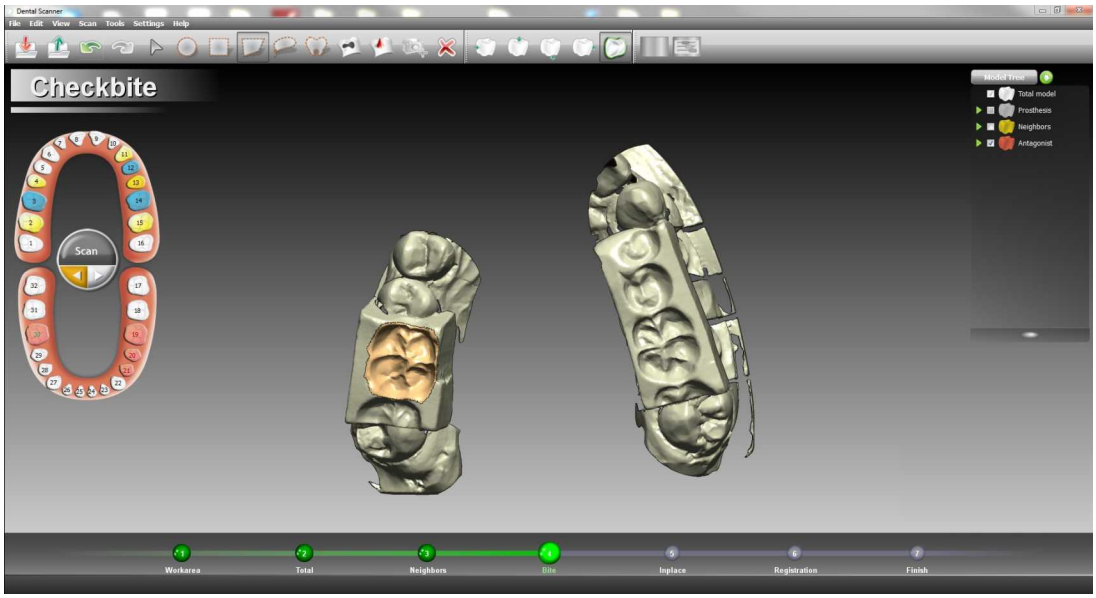


Checkbite acquisition

This Step is composed by two parts:

1. Total Model Acquisition with checkbite, 5 positions by default. A Finalize is required
2. At this point segmentation of the checkbite is needed to link each element to the proper tooth. After proper segmentation and linking the workflow proceeds in the standard way

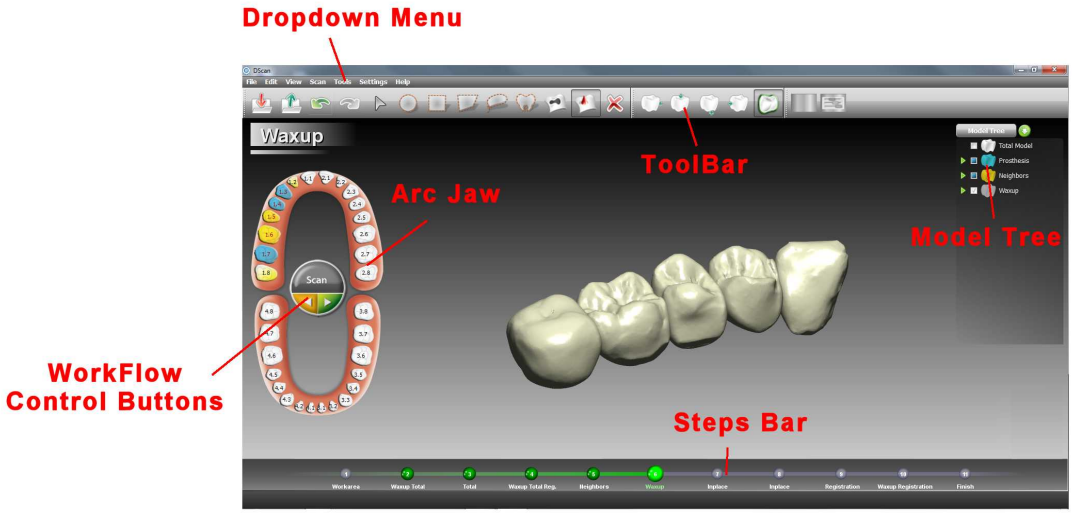
© 2012 Enter your company name



© 2012 Enter your company name

3.2.2 UI Elements

Scanner general UI layout is showed below:



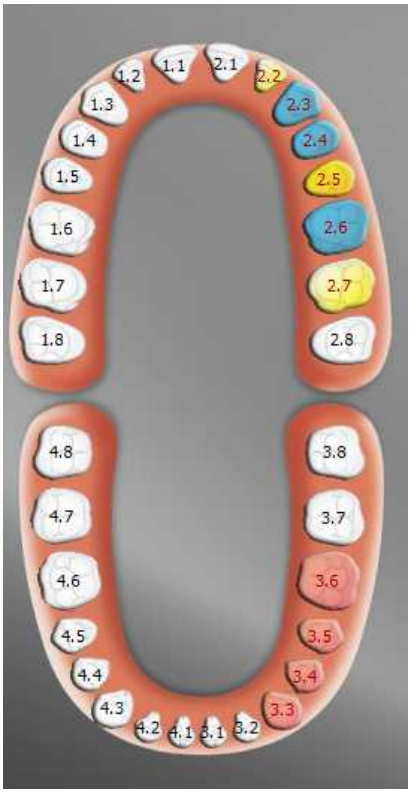
UI Elements include:

- Arc Jaw
- Workflow Control Buttons
- Model Tree
- Step Bar
- Toolbar Commands

© 2012 Enter your company name

3.2.2.1 Arc Jaw

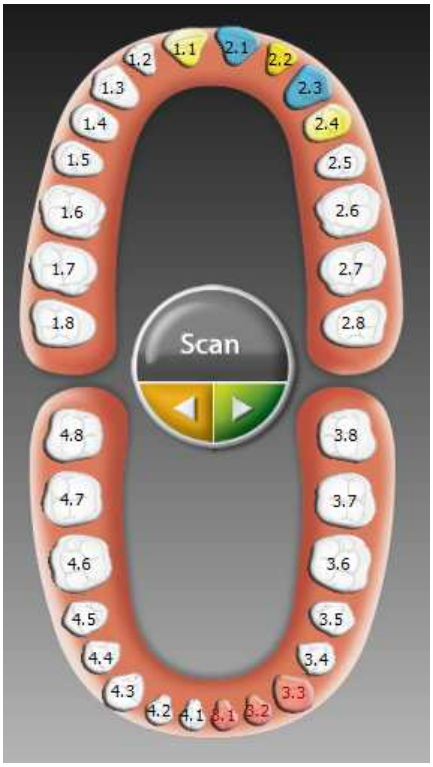
The left panel indicates which tooth are needed by the Dental Scanner; the user is expected to load the elements.



© 2012 Enter your company name

3.2.2.2 Workflow Control Buttons

In the middle of the arc jaw on the left three buttons drive the Acquisition Workflow. More than one button can be active in the same time



Next/Previous Buttons

When active (Green) it is possible to move to the next Step of Acquisition Workflow

When active (Yellow) it is possible to move to the previous Step of Acquisition Workflow

© 2012 Enter your company name

Actions Buttons

When active (Green) a Scan Step will be executed

When active (Red) a Scan Step is running. Using this button is possible to stop the Scanner. It immediately stops to acquire data and returns in zero axis position

When active (Yellow) a Finalize computation is performed. Data acquired by the scanner become meshes

When active (Blue) a Registration Step is performed

© 2012 Enter your company name

3.2.2.3 Model Tree

The right panel is the Model Tree that shows all the teeth loaded for each job defined.

Flag/Unflag the tooth drives its visibility. Mouse wheels drives the transparency

3.2.2.4 Step Bar

In the bottom of the screen the Step Bar shows all Acquisition Workflow Steps and highlight the current on

It is possible to jump from one Step to another one simply clicking on the green button.

3.2.2.5 Toolbar Commands

In the following, for each command of the toolbar image, from left to right, a brief description is provided.

© 2012 Enter your company name

3.2.2.5.1 Import Files

An Open file dialog pop up allowing the user to load multiple STL files in the scanner

3.2.2.5.2 Export Files

An Export Files dialog pop up allowing the user to export multiple STL files from the scanner

3.2.2.5.3 Undo/Redo

Undoes or Redoes last operation

3.2.2.5.4 Mesh Selectors

- Disabled selection: Switch to this tool when you want to simply navigate on model without any active selector
- Point selection: allows to select all the triangles inside a small circular region
- Rectangle selection: allows to select all triangles inside a rectangular region
- Polygon selection: allows to select all triangles inside a polygonal region

© 2012 Enter your company name

- Lazo selection: allows to select all triangles inside a free-hand closed region
- Cluster selection: selects all triangles in the picked cluster

3.2.2.5.5 Fill holes

Fills the holes in the mesh

3.2.2.5.6 Spike Removal

Flatten the triangles in a small area defined by polygon selection

3.2.2.5.7 Delete Selected triangles

Removes all the selected triangles

3.2.2.5.8 Standard Views

Sets the viewport to a standard direction

3.2.2.5.9 Show/Hide Mesh Borders

Graphical display option for showing or not the borders of the mesh in highlight

© 2012 Enter your company name

3.2.2.5.10 Show colormap

Enable/Disable the colormap while registering the elements

3.2.2.5.11 Gum registration slider

The slider is active only when acquiring the gum, refer to Gum for details on its usage

© 2012 Enter your company name

3.3 Preferences

It is possible to configure application parameters from drop down menu:

Setting -> Preferences

the dialog box has several tabs. See below for details

General

- UI Language: changes the user interface language
- Output format: changes the type of teeth nomenclature

Visualization

© 2012 Enter your company name

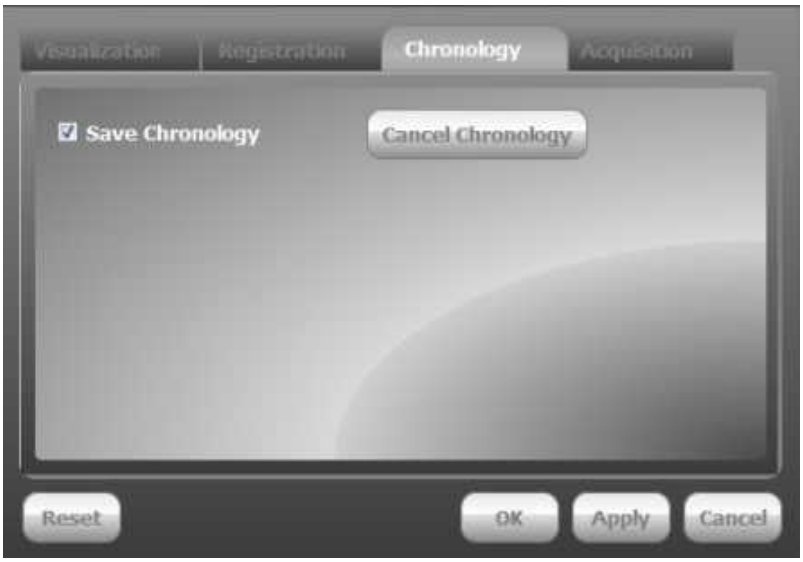
- ArcJaw Size: size of the arcjaw picture on the left side of the viewport;
- Antialiasing: enables the antialias filter;
- Steps bar animation: enables/disables the progress bar animation;
- Steps title: enables/disables the step title above the workjaw;
- Translucency widgets: enables/disables alpha blending on the viewport widgets;
- Only active teeth in the model tree: hide/show non active teeth in the model tree;
- Background image: show/hide background image;
- Graphic card memory: which must be disabled to bypass visualization errors when running **DentalCAD** in a low-end workstation.

Registration

© 2012 Enter your company name

- Set minimum and maximum tolerance of the color filter, while the registration algorithm is running

Chronology



- Enable/Disable chronology; press the CANCEL CHRONOLOGY button to clear the process list.

Acquisition

© 2012 Enter your company name

- Adjust the height of the scanning area.

© 2012 Enter your company name